

Biology—Grade 9

Biology—Grade 9			
	Units	Common Core Standards	Vocabulary
Unit 1: Chapter 1 <u>The Science of Biology</u>	Chapter 1, Section 1 Chapter 1, Section 2 Chapter 1, Section 3 Chapter 1, Section 4	<p>B1.1A Generate new questions that can be investigated in the laboratory or field.</p> <p>B1.1B Evaluate the uncertainties or validity of scientific conclusions using understanding of sources of measurement error, the challenges of controlling variable, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence of underlying assumptions.</p> <p>B1.1C Conduct scientific investigations using appropriate tools and techniques (e.g., selecting an instrument that measures the desired quantity—length, volume, weight, time interval, temperature—with the appropriate level of precision).</p> <p>B1.1D Identify patterns in data and relate them to theoretical models.</p> <p>B1.1E Describe a reason for a given conclusion using evidence from an investigation.</p> <p>B1.1f Predict what would happen if the variables, methods, or timing of an investigation were changed.</p> <p>B1.1g Use empirical evidence to explain and critique the reasoning used to draw a scientific conclusion or explanation.</p> <p>B1.1h Design and conduct a systematic scientific investigation that tests a hypothesis. Draw conclusions from data presented in charts or tables.</p> <p>B1.1i Distinguish between scientific explanations that are regarded as current scientific consensus and the emerging questions that active researchers investigate.</p> <p>B1.2A Critique whether or not specific questions can be answered through scientific investigations.</p> <p>B1.2B Identify and critique arguments about personal or societal issues based on scientific evidence.</p> <p>B1.2C Develop an understanding of a scientific concept by accessing information from multiple sources. Evaluate the scientific accuracy and significance of the information.</p> <p>B1.2D Evaluate scientific explanations in a peer review process or discussion format.</p> <p>B1.2E Evaluate the future career and occupational prospects of science fields.</p>	<p>Section 1-1 Science Observation Data Inference Hypothesis Scientific Method</p> <p>Section 1-2 Spontaneous generation Controlled Experiment Manipulated variable Responding variable Theory</p> <p>Section 1-3 Biology Cell Sexual Reproduction Metabolism Stimulus Homeostasis Evolution</p> <p>Section 1-4 Metric System Microscope Compound light microscope Electron microscope Cell culture Cell fractionation</p>
		<p>Assessment: Lab, Activity, Quiz, Chapter Test</p>	<p>3 Weeks</p>

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	Units	Common Core Standards (cont.)	Vocabulary	Pacing
Unit 1: Chapter 1 <u>The Science of Biology</u> (cont.)		<p>B1.2f Critique solutions to problems, given criteria and scientific constraints.</p> <p>B1.2g Identify scientific tradeoffs in design decisions and choose alternative solutions.</p> <p>B1.2h Describe the distinctions between scientific theories, laws, hypotheses, and observations.</p> <p>B1.2i Explain the progression of ideas and explanations that leads to science theories that are part of the current scientific consensus or core knowledge.</p> <p>B1.2j Apply science principles or scientific data to anticipate effects of technological design decisions.</p> <p>B1.2k Analyze how science and society interact from a historical, political, economic, or social perspective.</p> <p>B2.3A Describe how cells function in a narrow range of physical conditions, such as temperature and pH (acidity), to perform life functions.</p> <p>B2.3B Describe how the maintenance of a relatively stable internal environment is required for the continuation of life.</p> <p>B2.3C Explain how stability is challenged by changing physical, chemical, and environmental conditions as well as the presence of disease agents</p>		

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Units		Common Core Standards	Vocabulary	Pacing
Unit 1: Chapter 2 <u>The Chemistry of Life</u>	Chapter 2, Section 1 Chapter 2, Section 2 Chapter 2, Section 3 Chapter 2, Section 4	<p>L2.p5A Recognize the six most common elements in organic molecules (C, H, N, O, P, S). <i>(prerequisite)</i></p> <p>L2.p5B Identify the most common complex molecules that make up living organisms. <i>(prerequisite)</i></p> <p>L2.p5C Predict what would happen if essential elements were withheld from developing cells. <i>(prerequisite)</i></p> <p>B2.2A Explain how carbon can join to other carbon atoms in chains and rings to form large and complex molecules.</p> <p>B2.2B Recognize the six most common elements in organic molecules (C, H, N, O, P, S).</p> <p>B2.2C Describe the composition of the four major categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids).</p> <p>B2.2D Explain the general structure and primary functions of the major complex organic molecules that compose living organisms.</p> <p>B2.5A Recognize and explain that macromolecules such as lipids contain high energy bonds.</p> <p>B2.2f Explain the role of enzymes and other proteins in biochemical functions (e.g., the protein hemoglobin carries oxygen in some organisms, digestive enzymes, and hormones).</p> <p>B2.2g Propose how moving an organism to a new environment may influence its ability to survive and predict the possible impact of this type of transfer.</p> <p>L3.p4 Human Impact on Ecosystems <i>(prerequisite)</i>. All organisms cause changes in their environments. Some of these changes are detrimental, whereas others are beneficial. <i>(prerequisite)</i></p> <p>L3.p4A Recognize that, and describe how, human beings are part of Earth’s ecosystems. Note that human activities can deliberately or inadvertently alter the equilibrium in ecosystems. <i>(prerequisite)</i></p>	<p>Section 2-1 Atom Nucleus Electron Element Isotope Compound Ionic Bond Ion Covalent bond Molecule Vander Waals Forces</p> <p>Section 2-2 Cohesion Adhesion Mixture Solution Solute Solvent Suspension pH scale Acid Base Buffer</p> <p>Section 2-3 Monomer Polymer Carbohydrate Monosaccharide Polysaccharide Lipid Nucleic acid Nucleotide Ribonucleic acid (RNA) Deoxyribonucleic acid (DNA) Protein Amino Acid</p>	<p style="text-align: center;">1 ½ weeks</p> <p>Section 2-4 Chemical Reaction Reactant Product Activation energy Catalyst Enzyme Substrate</p>
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

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<p style="text-align: center;">Unit 2: Chapter 3 <u>The Biosphere</u></p> <p style="text-align: center;">Chapter 3, Section 1 Chapter 3, Section 2 Chapter 3, Section 3 Chapter 23 Plants</p>	<p>B2.5B Explain how major systems and processes work together in animals and plants including relationships between organelles, cells, tissues, organs, organ systems, and organisms. Relate these to molecular functions.</p> <p>B2.5C Describe how energy is transferred and transformed from the Sun to energy-rich molecules during photosynthesis.</p> <p>B2.5D Describe how individual cells break down energy-rich molecules to provide energy for cell functions.</p> <p>L3.p1A Provide examples of a population, community, and ecosystem. <i>(prerequisite)</i></p> <p>L3.p3D Predict how changes in one population might affect other populations based upon their relationships in a food web. <i>(prerequisite)</i></p> <p>B3.2A Identify how energy is stored in an ecosystem.</p> <p>B3.2B Describe energy transfer through an ecosystem, accounting for energy lost to the environment as heat.</p> <p>B3.2C Draw the flow of energy through an ecosystem. Predict changes in the food web when one or more organisms are removed.</p> <p>B3.3A Use a food web to identify and distinguish producers, consumers, and decomposers and explain the transfer of energy through trophic levels.</p> <p>B3.3b Describe environmental processes (e.g., the carbon and nitrogen cycles) and their role in processing matter crucial for sustaining life.</p> <p>L5.p1A Define a species and give examples. <i>(prerequisite)</i></p> <p>L5.p1B Define a population and identify local populations. <i>(prerequisite)</i></p> <p>L2.p3A Explain the significance of carbon in organic molecules. <i>(prerequisite)</i></p> <p>L2.p3B Explain the origins of plant mass. <i>(prerequisite)</i></p> <p>L2.p3C Predict what would happen to plants growing in low carbon dioxide atmospheres. <i>(prerequisite)</i></p> <p>L2.p3D Explain how the roots of specific plants grow. <i>(prerequisite)</i></p> <p>L2.p4A Classify different organisms based on how they obtain energy for growth and development. <i>(prerequisite)</i></p>	<p>Section 3-1 Ecology Biosphere Species Population Community Ecosystem Biome</p> <p>Section 3-2 Autotroph Producer Photosynthesis Chemosynthesis Heterotroph Consumer Herbivore Carnivore Omnivore Detritivore Decomposer Food Chain Food Web Trophic level Ecological Pyramid Biomass</p> <p>Section 3-3 Biogeochemical cycle Evaporation Transpiration Nutrient Nitrogen fixation Denitrification Primary productivity Limiting nutrient Algal bloom</p>	2 weeks
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Unit 2: Chapter 4 <u>Ecosystems and Communities</u>	Chapter 4, Section 1 Chapter 4, Section 2 Chapter 4, Section 3 Chapter 4, Section 4	<p>L3.p2A Describe common relationships among organisms and provide examples of producer/consumer, predator/prey, or parasite/host relationship. <i>(prerequisite)</i></p> <p>L3.p2B Describe common ecological relationships between and among species and their environments (competition, territory, carrying capacity, natural balance, population, dependence, survival, and other biotic and abiotic factors). <i>(prerequisite)</i></p> <p>L3.p2C Describe the role of decomposers in the transfer of energy in anecosystem.<i>(prerequisite)</i></p> <p>L3.p2D Explain how two organisms can be mutually beneficial and how that can lead to interdependency. <i>(prerequisite)</i></p> <p>L3.p3A Identify the factors in an ecosystem that influence fluctuations in population size. <i>(prerequisite)</i></p> <p>L3.p3B Distinguish between the living (biotic) and nonliving (abiotic) components of an ecosystem. <i>(prerequisite)</i></p> <p>L3.p3C Explain how biotic and abiotic factors cycle in an ecosystem (water,carbon, oxygen, and nitrogen). <i>(prerequisite)</i></p> <p>B3.4A Describe ecosystem stability. Understand that if a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages of succession that eventually result in a system similar to the original one.</p> <p>B3.4B Recognize and describe that a great diversity of species increases the chance that at least some living organisms will survive in the face ofcataclysmic changes in the environment.</p> <p>B3.4C Examine the negative impact of human activities.</p> <p>B3.4d Describe the greenhouse effect and list possible causes.</p> <p>B3.4e List the possible causes and consequences of global warming.</p>	<p>Section 4-1 Weather Climate Greenhouse effect Polar zone Temperate zone Tropical zone</p> <p>Section 4-2 Biotic factor Abiotic factor Habitat Niche Resource Competitive exclusion principle Predation Symbiosis Mutualism Commensalism Parasitism Ecological succession Primary succession Pioneer species Secondary succession</p> <p>Section 4-3 Biome Tolerance Microclimate Canopy Understory Deciduous Coniferous Humus Taiga Permafrost</p>	<p style="text-align: center;">1 ½ weeks</p> <p>Section 4-4 Plankton Phytoplankton Zooplankton Wetland Estuary Detritus Salt marsh Mangrove swamp Photic zone Aphotic zone Zonation Costal ocean Kelp forest Coral reef Benthos</p>
			<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>	

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Units		Common Core Standards	Vocabulary	Pacing
Unit 2: Chapter 5 <u>Populations</u>	Chapter 5, Section 1 Chapter 5, Section 2 Chapter 5, Section 3 Chapter 5, Section 4	<p>B3.5A Graph changes in population growth, given a data table.</p> <p>B3.5B Explain the influences that affect population growth.</p> <p>B3.5C Predict the consequences of an invading organism on the survival of other organisms.</p>	<p>Section 5-1 Population density Immigration Emigration Exponential growth Logistic growth Carrying capacity</p> <p>Section 5-2 Limiting factor Density-dependent limiting factor Predator-prey relationship Density-independent limiting factor</p> <p>Section 5-3 Demography Demographic transition Age structure diagram</p>	2 Weeks
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

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Unit 3: Chapter 6 Cell Structure and Function	Chapter 7, Section 1 Chapter 7, Section 2 Chapter 7, Section 3 Chapter 7, Section 4	<p>L2.p1A Distinguish between living and nonliving systems.</p> <p>L2.p1B Explain the importance of both water and the element carbon to cells.</p> <p>L2.p1C Describe growth and development in terms of increase in cell number, cell size, and/or cell products.</p> <p>L2.p1D Explain how the systems in a multicellular organism work together to support the organism.</p> <p>L2.p1E Compare and contrast how different organisms accomplish similar functions (e.g., obtain oxygen for respiration, and excrete waste).</p> <p>L2.p1E Compare and contrast how different organisms accomplish similar functions (e.g., obtain oxygen for respiration, and excrete waste).</p> <p>L2.p2A organisms sustain life by obtaining, transporting, transforming, releasing, and eliminating matter and energy.</p> <p>L2.p2B Describe the effect of limiting food to developing cells.</p> <p>B2.4g Explain that some structures in the modern eukaryotic cell developed from early prokaryotes, such as mitochondria, and in plants, chloroplasts.</p> <p>B2.5h Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, and active transport).</p> <p>B2.5i Relate cell parts/organelles to their function.</p> <p>B2.5g Compare and contrast plant and animal cells.</p> <p>B2.4g Explain that some structures in the modern eukaryotic cell developed from early prokaryotes,</p>	<p>Section 7-1 Cell Cell theory Nucleus Eukaryote Prokaryote</p> <p>Section 7-2 Organelle Cytoplasm Nuclear envelope Chromatin Chromosome Nucleolus Ribosome Endoplasmic reticulum Golgi apparatus Lysosome Vacuole Mitochondrion Chloroplast Cytoskeleton Centriole</p> <p>Section 7-3 Cell membrane Cell wall Lipid bilayer Concentration Diffusion Equilibrium Osmosis Isotonic Hypertonic Hypotonic Facilitated diffusion Active transport Endocytosis Phagocytosis Pinocytosis</p>	<p style="text-align: center;">3 weeks</p> <p>Section 7-4 Cell Specialization Tissue Organ Organ System</p>
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

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Unit 3: Chapter 7 <u>Photosynthesis</u>	Chapter 8, Section 1 Chapter 8, Section 2 Chapter 8, Section 3 Chapter 8, Section 4	<p>B2.1B Compare and contrast the transformation of matter and energy during photosynthesis and respiration.</p> <p>B2.1A Explain how cells transform energy (ultimately obtained from the sun) from one form to another through the processes of photosynthesis and respiration. Identify the reactants and products in the general reaction of photosynthesis.</p> <p>B2.5e Explain the interrelated nature of photosynthesis and cellular respiration in terms of ATP synthesis and degradation.</p> <p>B2.5f Relate plant structures and functions to the process of photosynthesis and respiration.</p> <p>B3.1A Describe how organisms acquire energy directly or indirectly from sunlight.</p> <p>B3.1f Summarize the process of photosynthesis.</p>	<p>Section 8-1 Autotroph Heterotroph Adenosine triphosphate (ATP)</p> <p>Section 8-2 Photosynthesis Pigment Chlorophyll</p> <p>Section 8-3 Thylakoid Photosystems Stroma NADP+ Light-dependent reactions ATP synthase Calvin Cycle</p>	2 weeks
		<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>		

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Unit 3: Chapter 8 <u>Cellular Respiration</u>	Chapter 9, Section 1 Chapter 9, Section 2	<p>B2.4B Describe how various organisms have developed different specializations to accomplish a particular function and yet the end result is the same (e.g., excreting nitrogenous wastes in animals, obtaining oxygen for respiration).</p> <p>B2.4C Explain how different organisms accomplish the same result using different structural specializations (gills vs. lungs vs. membranes).</p> <p>B2.4d Analyze the relationships among organisms based on their shared physical, biochemical, genetic, and cellular characteristics and functional processes.</p> <p>B2.4e Explain how cellular respiration is important for the production of ATP (build on aerobic vs. anaerobic).</p> <p>B2.4f Recognize and describe that both living and nonliving things are composed of compounds, which are themselves made up of elements joined by energy-containing bonds, such as those in ATP.</p> <p>B2.5e Explain the interrelated nature of photosynthesis and cellular respiration in terms of ATP synthesis and degradation.</p> <p>B2.5f Relate plant structures and functions to the process of photosynthesis and respiration.</p>	<p>Section 9-1 Calorie Glycolysis Cellular respiration NAD+ Fermentation Anaerobic</p> <p>Section 9-2 Aerobic Krebs cycle Electron transport chain</p>	1 ½ weeks
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

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Unit 3: Chapter 9 <u>Cell Growth and Division</u>	<p>Chapter 10, Section 1 Chapter 10, Section 2 Chapter 10, Section 3 Chapter 10, Section 4 Chapter 11, Section 4</p>	<p>B2.1C Explain cell division, growth, and development as a consequence of an increase in cell number, cell size, and/or cell products. B2.1d Describe how, through cell division, cells can become specialized for specific function. B2.6a Explain that the regulatory and behavioral responses of an organism to external stimuli occur in order to maintain both short- and long-term equilibrium. B2.r6b Explain that complex interactions among the different kinds of molecules in the cell cause distinct cycles of activities, such as growth and division. Note that cell behavior can also be affected by molecules from other parts of the organism, such as hormones. <i>(recommended)</i> B2.r6c Recognize and explain that communication and/or interaction are required between cells to coordinate their diverse activities. <i>(recommended)</i> B2.r6d Explain how higher levels of organization result from specific complex interactions of smaller units and that their maintenance requires a constant input of energy as well as new material. <i>(recommended)</i> B2.r6e Analyze the body’s response to medical interventions such as organ transplants, medicines, and inoculations. <i>(recommended)</i> B4.4c Explain how mutations in the DNA sequence of a gene may be silent or result in phenotypic change in an organism and in its offspring. B4.3A Compare and contrast the processes of cell division (mitosis and meiosis), particularly as those processes relate to production of new cells and to passing on genetic information between generations. B4.3B Explain why only mutations occurring in gametes (sex cells) can be passed on to offspring. B4.3e Recognize that genetic variation can occur from such processes as crossing over, jumping genes, and deletion and duplication of genes.</p>	<p>Section 10-1 Cell division</p> <p>Section 10-2 Mitosis Cytokinesis Chromatid Centromere Interphase Cell cycle Prophase Centriole Spindle Metaphase Anaphase Telophase</p> <p>Section 10-3 Cyclin Cancer</p> <p>Section 11-4 Homologous Diploid Haploid Meiosis Tetrad Crossing –over</p>	<p>2 weeks</p>
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

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Units		Common Core Standards	Vocabulary	Pacing
Unit 4: Chapter 10 <u>Introduction to Genetics</u>	Chapter 11, Section 1 Chapter 11, Section 2 Chapter 11, Section 3	<p>L4.p1A Compare and contrast the differences between sexual and asexual reproduction <i>(prerequisite)</i></p> <p>L4.p1B Discuss the advantages and disadvantages of sexual vs. asexual reproduction. <i>(prerequisite)</i></p> <p>L4.p2A Explain that the traits of an individual are influenced by both the environment and the genetics of the individual. Acquired traits are not inherited; only genetic traits are inherited. <i>(prerequisite)</i></p> <p>B4.1A Draw and label a homologous chromosome pair with heterozygous alleles highlighting a particular gene location.</p> <p>B4.1B Explain that the information passed from parents to offspring is transmitted by means of genes that are coded in DNA molecules. These genes contain the information for the production of proteins.</p> <p>B4.1c Differentiate between dominant, recessive, codominant, polygenic, and sex-linked traits.</p> <p>B4.1d Explain the genetic basis for Mendel’s laws of segregation and independent assortment.</p> <p>B4.1e Determine the genotype and phenotype of monohybrid crosses using a Punnett Square.</p>	<p>Section 11-1 Genetics Fertilization True-breeding Trait Hybrid Gene Allele Segregation Gamete</p> <p>Section 11-2 Probability Punnett square Homozygous Heterozygous Phenotype Genotype</p> <p>Section 11-3 Independent assortment Incomplete Codominance Multiple alleles Polygenic traits</p> <p>Section 11-5 Gene map</p>	3 weeks
		<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>		

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Unit 4: Chapter 11 DNA and RNA	<p>Chapter 12, Section 1</p> <p>Chapter 12, Section 2</p> <p>Chapter 12, Section 3</p> <p>Chapter 12, Section 4</p> <p>Chapter 12, Section 5</p>	<p>B4.2A Show that when mutations occur in sex cells, they can be passed on to offspring (inherited mutations), but if they occur in other cells, they can be passed on to descendant cells only (noninherited mutations).</p> <p>B4.2B Recognize that every species has its own characteristic DNA sequence.</p> <p>B4.2C Describe the structure and function of DNA.</p> <p>B4.2E Propose possible effects (on the genes) of exposing an organism to radiation and toxic chemicals.</p> <p>B4.2f Demonstrate how the genetic information in DNA molecules provides instructions for assembling protein molecules and that this is virtually the same mechanism for all life forms.</p> <p>B4.2g Describe the processes of replication, transcription, and translation and how they relate to each other in molecular biology.</p> <p>B4.2h Recognize that genetic engineering techniques provide great potential and responsibilities.</p> <p>B4.r2i Explain how recombinant</p> <p>B4.4a Describe how inserting, deleting, or substituting DNA segments can alter a gene. Recognize that an altered gene may be passed on to every cell that develops from it and that the resulting features may help, harm, or have little or no effect on the offspring's success in its environment.</p> <p>B4.4b Explain that gene mutation in a cell can result in uncontrolled cell division called cancer. Also know that exposure of cells to certain chemicals and radiation increases mutations and thus increases the chance of cancer.</p>	<p>Section 12-1 Transformation Bacteriophage Nucleotide Base pairing</p> <p>Section 12-2 Chromatin Histone Replication DNA polymerase</p> <p>Section 12-3 Gene Messenger RNA Ribosomal RNA Transfer RNA Transcription RNA polymerase Promoter Intron Exon Codon Translation Anticodon</p> <p>Section 12-4 Mutation Point mutation Frameshift mutation Polyploidy</p> <p>Section 12-5 Operon Operator Differentiation Hox gene</p>
		<p>Assessments: Activity, Quiz, Chapter Test</p>	2 weeks

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Units		Common Core Standards	Vocabulary	Pacing
Unit 4: Chapter 12 <u>Genetic Engineering</u>	Chapter 13, Section 1 Chapter 13, Section 2 Chapter 13, Section 3 Chapter 13, Section 4	<p>B4.r5a Explain how recombinant DNA technology allows scientists to analyze the structure and function of genes. <i>(recommended)</i></p> <p>B4.r5b Evaluate the advantages and disadvantages of human manipulation of DNA. <i>(recommended)</i></p> <p>B2.1e Predict what would happen if the cells from one part of a developing embryo were transplanted to another part of the embryo.</p> <p>B4.3g Explain that cellular differentiation results from gene expression and/or environmental influence (e.g., metamorphosis, nutrition).</p>	<p>Section 13-1 Selective breeding Hybridization Inbreeding</p> <p>Section 13-2 Genetic engineering Restriction enzymes Gel electrophoresis Recombinant DNA Polymerase chain reaction</p> <p>Section 13-3 Plasmid Genetic marker</p> <p>Section 13-4 Transgenic Clone</p>	1 ½ weeks
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

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Unit 4: Chapter 13 <u>The Human Genome</u>	Chapter 14, Section 1 Chapter 14, Section 2 Chapter 14, Section 3	<p>B4.2D Predict the consequences that changes in the DNA composition of particular genes may have on an organism (e.g., sickle cell anemia, other).</p> <p>B4.3C Explain how it might be possible to identify genetic defects from just a karyotype of a few cells.</p> <p>B4.3d Explain that the sorting and recombination of genes in sexual reproduction result in a great variety of possible gene combinations from the offspring of two parents.</p> <p>B4.3f Predict how mutations may be transferred to progeny.</p>	<p>Section 14-1 Karyotype Sex chromosome Autosome Pedigree</p> <p>Section 14-2 Sex-linked gene Nondisjunction</p> <p>Section 14-3 DNA fingerprinting</p>	1 ½ weeks
		<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>		

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Unit 5: Chapter 14 <u>Darwin's Theory of Evolution</u>	Chapter 15, Section 1 Chapter 15, Section 2 Chapter 15, Section 3	<p>B5.1d Explain how a new species or variety originates through the evolutionary process of natural selection.</p> <p>B5.1e Explain how natural selection leads to organisms that are well suited for the environment (differential survival and reproduction of chance inherited variants, depending upon environmental conditions).</p> <p>B5.1f Explain, using examples, how the fossil record, comparative anatomy, and other evidence supports the theory of evolution.</p> <p>B5.1g Illustrate how genetic variation is preserved or eliminated from a population through natural selection (evolution) resulting in biodiversity.</p> <p>B5.3A Explain how natural selection acts on individuals, but it is populations that evolve. Relate genetic mutations and genetic variety produced by sexual reproduction to diversity within a given population.</p>	<p>Section 15-1 Evolution Theory Fossil</p> <p>Section 15-2 No Vocab</p> <p>Section 15-3 Artificial selection Struggle for existence Fitness Adaptation Survival of the fittest Natural selection Descent with modifications Common descent Homologous structure Vestigial organ</p>	1 ½ weeks
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

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Unit 5: Chapter 15 <u>Evolution of Populations</u>	Chapter 16, Section 1 Chapter 16, Section 2 Chapter 16, Section 3	<p>L5.p1C Explain how extinction removes genes from the gene pool. (<i>prerequisite</i>)</p> <p>B5.1A Summarize the major concepts of natural selection (differential survival and reproduction of chance inherited variants, depending on environmental conditions).</p> <p>B5.1B Describe how natural selection provides a mechanism for evolution.</p> <p>B5.3B Describe the role of geographic isolation in speciation.</p> <p>B4.3C Give examples of ways in which genetic variation and environmental factors are causes of evolution and the diversity of organisms.</p> <p>B5.3d Explain how evolution through natural selection can result in changes in biodiversity.</p> <p>B5.3e Explain how changes at the gene level are the foundation for changes in populations and eventually the formation of new species.</p>	<p>Section 16-1 Gene pool Relative frequency Single-gene trait Polygenic trait</p> <p>Section 16-2 Directional selection Stabilizing selection Disruptive selection Genetic drift Founder effect Hardy-Weinberg principle Genetic equilibrium</p> <p>Section 16-3 Speciation Reproductive isolation Behavioral isolation Geographic isolation Temporal isolation</p>	1 ½ weeks
	<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>			

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Unit 5: Chapter 16 <u>The History of Life</u>	Chapter 17, Section 1 Chapter 17, Section 2 Chapter 17, Section 3 Chapter 17, Section 4	<p>L5.p1D Explain the importance of the fossil record. (<i>prerequisite</i>)</p> <p>B5.1c Summarize the relationships between present-day organisms and those that inhabited the Earth in the past (e.g., use fossil record, embryonic stages, homologous structures, chemical basis).</p> <p>B5.3f Demonstrate and explain how biotechnology can improve a population and species.</p> <p>L5.p2A Explain, with examples, that ecology studies the varieties and interactions of living things across space while evolution studies the varieties and interactions of living things across time. (<i>prerequisite</i>)</p>	<p>Section 17-1 Paleontologist Fossil record Extinct Relative dating Index fossil Half-life Radioactive dating Geologic time scale Era Period</p> <p>Section 17-2 Proteinoid Microsphere Microfossil Endosymbiotic theory</p> <p>Section 17-3 Mass extinction</p> <p>Section 17-4 Macroevolution Adaptive radiation Convergent evolution Coevolution Punctuated equilibrium</p>	1 ½ weeks
		<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>		

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Units		Common Core Standards	Vocabulary	Pacing
Unit 5: Chapter 17 <u>Classification</u>	Chapter 18, Section 1 Chapter 18, Section 2 Chapter 18, Section 3	<p>B5.2a Describe species as reproductively distinct groups of organisms that can be classified based on morphological, behavioral, and molecular similarities.</p> <p>B5.2b Explain that the degree of kinship between organisms or species can be estimated from the similarity of their DNA and protein sequences.</p> <p>B5.2c Trace the relationship between environmental changes and changes in the gene pool, such as genetic drift and isolation of subpopulations.</p> <p>B5.r2d Interpret a cladogram or phylogenetic tree showing evolutionary relationships among organisms. (<i>recommended</i>)</p> <p>B2.4A Explain that living things can be classified based on structural, embryological, and molecular (relatedness of DNA sequence) evidence.</p>	<p>Section 18-1 Taxonomy Binomial nomenclature Genus Taxon Family Order Class Phylum Kingdom</p> <p>Section 18-2 Phylogeny Evolutionary classification Derived Character Cladogram Molecular clock</p> <p>Section 18-3 Domain Bacteria Eubacteria Archaea Archaeobacteria Eukarya Protista Fungi Plantae Animalia</p>	3 days
		<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>		

Biology—Grade 9

	Units	Common Core Standards	Vocabulary	Pacing
Unit 6: Chapter 18 <u>Bacteria and Viruses</u>	<p>Chapter 19, Section 1 Chapter 19, Section 2 Chapter 19, Section 3</p>	<p>B2.4h Describe the structures of viruses and bacteria. B2.4i Recognize that while viruses lack cellular structure, they have the genetic material to invade living cells.</p>	<p>Section 19-1 Prokaryote Bacillus Coccus Spirillum Chemoheterotroph Photoheterotroph Chemoautotroph Obligate aerobe Obligate anaerobe Facultative anaerobe Binary fission Conjugation Endospore Nitrogen fixation</p> <p>Section 19-2 Virus Capsid Bacteriophage Lytic infection Lysogenic infection Prophage Retrovirus</p> <p>Section 19-3 Pathogen Vaccine Antibiotic Viroid Prion</p>	3 days
		<p>Assessments: Activity, Quiz, Chapter Test</p>		

Biology—Grade 9

Units		Common Core Standards	Vocabulary	Pacing
Unit : 9 Chapter 19 <u>Comparing Chordates</u>	Chapter 32, Section 2 Chapter 32, Section 3	<p>B2.3d Identify the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, excretion, protection from disease, and movement, control, and coordination) and describe ways that these systems interact with each other.</p> <p>B2.3e Describe how human body systems maintain relatively constant internal conditions (temperature, acidity, and blood sugar).</p> <p>B2.3f Explain how human organ systems help maintain human health.</p> <p>B2.3g Compare the structure and function of a human body system or subsystem to a nonliving system (e.g., human joints to hinges, enzyme and substrate to interlocking puzzle pieces).</p>	<p>Section 32-2 Ectotherm Endotherm</p> <p>Section 32-3 Alveolus</p>	2 days
	<p>Assessments: Lab, Activity, Quiz, Chapter Test</p>			