Biology

Unit 1 Basic Principals of Life

Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives & Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
15 Days	All organisms on earth share common characteristics of life.	How do we know if something is alive?	Common Characteristics of life: All living things are made up of one or more units called cells Cells occur in two basic forms: prokaryotic and eukaryotic Obtain and use matter and energy to carry out their life processes Reproduce and pass out their genetic material to the next generation Seek and Maintain a biological balance between their internal and external environments Grow, develop and eventually die	List and describe the common characteristics exhibited by all living things- both prokaryotic and eukaryotic Compare cellular structures and their functions in prokaryotic and eukaryotic cells		Prokaryotic cell Eukaryotic cell Stimuli Adapt Evolve Population	Standards; 3.1.B.A1 3.1.B.A5 3.1.B.A9 3.1.B.C2 3.2.B.A8 4.1.3.A 4.1.4.A Eligible Content: BIO.A.1.1.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

			Detect and respond to stimuli Adapt and evolve at the population level				
	Structure is related to function at al biological levels of the organization.	How is structure related to function at the various levels of cellular organization?	Similarities and differences in structure between prokaryotic and eukaryotic cells Relationship between form and function Common features/ functions of cell structures on both Prokaryotic and eukaryotic cells Levels of biological organization from organelle to multicellular organism o Organelle o Cell o Tissue o Organ o Organ System o Multicellular Organism Cell surface area to volume ratio controls cell size.	Describe and interpret relationships between structure and function at the organelle, cell tissue, organ, organ system and multicellular organism level of organization.		Organelle Cell Tissue Organ Organ System Multicellular Organism	Standards: 3.1.B.A1 3.1.B.A5 3.1.B.A6 3.1.B.C2 4.1.3.A 4.1.4.A Eligible Content: BIO.A1.2.1 BIO.A.1.2.2 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

	Review for Common Assessment Unit 1 Basic Properties of Life Duration: 1 Day						
	Common Assessment Unit 1 Basic Properties of Life Duration: 1 Day						
Unit 2 Chemical Basis for Life (Biochemistry)							
Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
20 days	Life is a product of the organization and interaction of matter	How is life a product of the organization and interaction of matter?	Organic vs. Inorganic Matter - matter is anything that occupies space and has mass - Levels of Biochemical organization (atom, elements, molecules, macromolecules and compounds) -living things are made up of molecules			Organic matter Inorganic matter Mass Atoms Elements Molecules Macromolecules Compounds	Standards: 3.1.B.A7 3.1.B.A.5 4.2.5.C Eligible Content: BIO.2.2.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	Life is a product of the organization and interaction of matter	How is life a product of the organization and interaction of matter?	Chemical structure of water Polarity of water/hydrogen	Describe the unique properties of water.		Polarity Hydrogen Bond Adhesion	Standards: 3.1.B.A5 3.1.B.A.8 4.2.5.C

			bonding and related properties. - Adhesion and Cohesion(surface tension and capillary action) - High Specific Heat - Universal Solvent - Density Anomaly Examples of how the properties of water support life. - temperature moderation -solid water less dense than liquid water -water cycle Metabolism requires an aqueous environment -transportation -buffering properties of water	Explain how the unique properties of water support life on earth.		Cohesion Surface tension Capillary action High specific heat Universal solvent Density anomaly	Eligible Content: BIO.2.1.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	Life is a product of the organization and interaction of matter	How is life a product of the organization and interaction of matter?	Chemical properties of carbon atoms. (Form 4 covalent Bonds) Structural Shapes of carbon molecules(straight chains, branch chains, rings) Monomers vs.	Describe the structure of a carbon atom. Explain how the carbon atoms bond to form biological macromolecules from monomers.		Macromolecule Monomer Polymer Dehydration Synthesis (condensation)	Standards: 3.1.B.A2 3.1.B.A7 3.1.B.A8 3.1.C.A2 3.1.C.A7 Eligible Content: BIO.2.2.1

			Polymers Monomer that forms carbohydrates, protein and nucleic acids. (monosaccharide, amino acids, nucleotide) Idea of no common monomer for lipids Dehydration Synthesis (condensation) and Hydration reactions. Basic structure of the 4 major classes of biological macromolecules (common chemical components, examples of monomers form each class, examples of polymers constructed from monomers) Importance and use of each macromolecule for biological function.	Compare the structure and function of carbohydrates, lipids and nucleic acids in organisms.		Hydrolysis Monosaccharide Amino acid Nucleotide Carbohydrates Lipids Proteins Nucleic acids	BIO.2.2.2 BIO.2.2.3 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	Life is a product of the organization and interaction	How is life a product of the organization and interaction	Enzymes as proteins Enzymes as Substrate specify/interactions	Explain how enzymes act as catalysts to regulate		Enzyme Catalyst	Standards 3.1.B.A2 3.1.B.A7 3.1.C.A2

	of matter	of matter?	(Lock and Key Model) Effect of enzymes on activation energy and reaction rates Reusable nature of enzymes Examples of enzyme controlled reactions in living things Enzyme activity as a function of specific conditions. Effects of environmental factors (pH, temperature, concentration) on enzyme function	biochemical reactions. Explain how environmental factors affect the function and reaction rate of the enzyme. Interpret graphs to analyze enzyme catalyzed reactions.		Substrate Activation energy Active site Reaction rates pH Concentration	3.1.C.A7 Eligible Content BIO.A.2.3.1 BIO.A.2.3.2 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	Review Common Assessment Unit 2 The Chemical Basis for Life Duration: 1 Day						
	Common Assessment Unit 2 The Chemical Basis for Life Duration: 1 Day						

Unit 3 Cell Structures and Functions

Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**

10 Days	Through a variety of mechanisms, organisms maintain homeostasis	How do organisms maintain biological balance between their internal and external environments?	Similarities and differences in structure between prokaryotic and eukaryotic cells. Common features/ functions of cell structures on both Prokaryotic and eukaryotic cells	Describe and interpret relationships between structure and function at the organelle, cell tissue, organ, organ system and multicellular organism level of organization.		Prokaryotic cells Eukaryotic Cells Organelle Plasma membrane Cytoplasm DNA Ribosomes	Standards: 3.1.B.A2 3.1.B.A5 3.1.B.A4 3.1.B.A7 3.2.C.A1 3.2.C.A6 Eligible Content: BIO.A.4.1.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	Review Common Assessment Unit 3 Cell Structure and Function Duration: 1 Day						
	Common Assessment Unit 3 Cell Structure and Function Duration: 1 Day						
Unit 4 Cellular Transport and Homeostasis							
Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
20 Days	Through a	How do	Chemical structure of	Describe how the		Phospholipids	Standards:

	variety of mechanisms, organisms maintain homeostasis	organisms maintain biological balance between their internal and external environments?	the plasma membrane (Phospholipid Bilayer) Fluid mosaic model Functions of the plasma membrane Passive transport mechanisms - Diffusion - Osmosis - Facilitated Diffusion Active transport mechanisms - pumps - endocytosis - exocytosis Endoplasmic Reticulum - Rough ER (Synthetic transport of protiens) - Smooth ER (synthesis/transport of lipids, synthesis transport of Carbohydrates) Golgi Apparatus (processes and packages for intra and extra cellular transport	structure of a plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell. Compare and contrast active vs. passive transport mechanisms. Describe how membrane-bound cellular organelles facilitate intracellular transport of materials.		bilayer Fluid mosaic model Selective permeable Passive transport Diffusion Osmosis Facilitated Diffusion Active transport Pumps Endocytosis Exocytosis Homeostasis Intracellular transport Endoplasmic reticulum Golgi apparatus vesicles	3.1.B.A.2 3.1.B.A.4 3.1.B.A.5 3.1.B.A.7 3.2.C.A.5 3.2.P.B.6 Eligible Content: BIO.A.4.1.1 BIO.A.4.1.2 BIO.A.4.1.3 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

	Through a variety of mechanisms, organisms maintain homeostasis	How do organisms maintain biological balance between their internal and external environments?	Examples of mechanisms - Thermoregulation - Water Regulation - Oxygen Regulation - Chemical regulation (pH/buffers, hormones, electrolytes	Identify and explain mechanisms organism use to maintain homeostasis		Buffers Electrolyte Thermoregulation	
	Review Common Assessment Unit 4 Cellular Transport and Homeostasis Duration: 1 Day						
	Common Assessment Unit 4 Cellular Transport and Homeostasis Duration: 1 Day						
Unit 5 Energy Transformations (Bioenergetics)							
Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
20 days	Organisms obtain and use energy to carry out their life processes.	How do organisms obtain and use energy to carry out their life's processes?	Double membrane structure of mitochondria Double membrane structure of chloroplasts Roles of mitochondria and chloroplasts in energy transformations	Describe the structure of mitochondria and chloroplasts in eukaryotic cells. Describe the fundamental roles of plastids (e.g.,chloroplasts) and mitochondria in energy		Mitochondria Plastids Chloroplasts Photosynthesis Cellular respiration	Standards 3.1.B.A2 3.1.B.A5 3.1.C.A1 Eligible Content BIO.A.3.1.1 Acad. Stand. for Reading in Science and Tech. *CC.3.5.9-10A* *CC.3.5.9-10B* *CC.3.5.9-10C*

				transformations.			*CC.3.5.9-10D* *CC.3.5.9-10E* *CC.3.5.9-10G* CC.3.5.9-10H CC.3.5.9-10I
	Organisms obtain and use energy to carry out their life processes.	How do organisms obtain and use energy to carry out their life's processes?	Catabolic vs. Anabolic chemical reactions related to metabolism Overall (summary) chemical equations for photosynthesis and cellular respiration Basic energy transformations during photosynthesis and cellular respiration Relationship between photosynthesis and cellular respiration Molecular structure of ATP ATP-ADP cycle Importance of ATP as the energy currency (fuel) for cell process	Compare the basic transformations of energy during photosynthesis and cellular respiration. Describe the structure of ADP Describe the role of ATP in biochemical reactions		Metabolism Anabolic reaction Catabolic reaction Chemical energy Adenosine triphosphate (ATP) Adenosine diphosphate (ADP)	Standards 3.1.B.A2 3.1.B.A5 3.1.C.A1 3.1.C.A2 Eligible Content BIO.A.3.2.1 BIO.A.3.2.2 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

	Review Common Assessment Unit 5 Energy Transformations (Bioenergetics) Duration: 1 Day						
	Common Assessment Unit 5 Energy Transformations (Bioenergetics) Duration: 1 Day						
Unit 6 Cell Growth and Reproduction							
Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
20 Days	In nature, new cells arise from the division of pre-existing cells.	How do cells grow and reproduce?	Cell cycle in a non-reproductive, eukaryotic cell: Interphase (G1,S,G2) Nuclear Division (Mitosis and Meiosis) Cytokinesis (plant vs. animal) Phases of mitosis: prophase, metaphase, anaphase, telephase Phases of meiosis in diploid, germ-line stem cells Importance of Mitosis and Meiosis Outcomes of Mitosis and Meiosis	Describe the events that occur during the cell cycle. Compare and contrast the processes and outcomes of mitotic and meiotic nuclear divisions. Describe processes that can alter composition or number of chromasomes (chromosomal mutations)		Cell cycle Interphase Mitosis Meiosis Cytokinesis Cell plate Cleavage furrows Prophase Metaphase Anaphase Telophase	Standards 3.1.B.A4 3.1.B.A5 3.1.B.B2 3.1.B.B3 3.1.B.B5 3.1.B.C2 3.1.C.B2 Eligible Content BIO.B.1.1.1 BIO.B.1.1.2 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

			Importance of chromosomal composition and number of controlling phenotypes Chromosomal Mutations during Mitosis and Meiosis Process of DNA Replication (preview)			Haploid Diploid Chromosome Chromatid Homologous chromosomes Tetrad Crossing over spindle (fiber) Somatic Cells Gametes Chromosomal mutation Nondisjunction Duplication Translocation Deletion Insertion Inversion	

	Review Common Assessment Unit 6 Cell Growth and Reproduction Duration: 1 Day
	Common Assessment Unit 6 Cell Growth and Reproduction Duration: 1 Day

Unit 7 Inheritance Patterns (Genetics)

Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
15 Days	Genes are expressed in a variety of predictable patterns of inheritances	How do organisms pass their inheritance onto their offspring?	Common Inheritance patterns Tools for predicting patterns of inheritance: Punnett Square Pedigree Mathematics and Probability Relationship between genotype and phenotype Chromosomal mutations and their impacts (Karyotyope analysis) Genetic Disorders (Autosomal Dominant, Autosomal Recessive)	Describe and/ or predict observed patterns of inheritance. Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance. Describe the processes that can alter composition or number of chromosomes		Dominant Recessive Incomplete Dominance Codominence Punnett square Pedigree Autosomal Dominant Autosomal recessive Sex-linked DNA	Standards 3.1.B.B1 3.1.B.B2 3.1.B.B.3 3.1.B.B5 3.1.B.C2 3.1.C.C2 Eligible Content BIO.B.1.2.1 BIO.B.2.1.1 BIO.B.2.1.1 BIO.B.2.1.2 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

						Alleles Chromosomes Genes Genotype Heterozygous/hybrid Homozygous/pure Multiple alleles Phenotype Polygenetic Testcross	
	Review Common Assessment Unit 7 Inheritance Patterns Duration: 1 Day						
	Common Assessment Unit 7 Inheritance Patterns Duration: 1 Day						
Unit 8 DNA and Protein Synthesis							
Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
20 Days	DNA, RNA and protein	How do organisms use	Structures of DNA: Components of a	Describe how DNA replication		Adenine	Standards 3.1.B.A5

	synthesis are the blueprints of organisms	DNA and RNA to make proteins? What factors affect gene expression?	Nucleotide Base-pair Rule(Chargaff's rule) Semi-conservative/DNA replication process Structure of eukaryotic chromosomes Similarities and Differences between DNA and RNA Transcriptions between DNA and RNA Translation uses RNA to make protein Role of ribosomes, endoplasmic reticulum and golgi apparatus is assembling, transporting, packaging, and modifying different proteins Phenotype as a function of gene expression (DNA to	results in the transmission and/or conservation of genetic information. Explain the structural relationships between DNA, genes and chromosomes. Explain the unified process of protein synthesis. Describe the role of the nucleus, ribosomes, ER, and gogli apparatus in the production and processing of proteins. Describe how genetic mutations alter the DNA sequence and may or may not effect phenotype.		Amino acids Anticodon Chargaff's Rule Chromosomes Codon Complimentary strand Cytosine Deletion Deoxyribonucleic Acid (DNA) Deoxyribose DNA replication Double helix Endoplasmic reticulum Enzymes Frameshift mutation Gene mutation Genes	3.1.B.A8 3.1.B.B1 3.1.B.B3 3.1.B.B5 3.1.B.B6 Eligible Content BIO.B.1.2.1 BIO.B.1.2.2 BIO.B.2.2.1 BIO.B.2.2.2 BIO.B.2.3.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

			protein to phenotype) Environmental influences on phenotype.			Gogli apparatus Guanine Hydrogen bond Insertion Missense Nonsense Nucleotide Nucleus Parent strand Phenotype Phosphate group Point mutation Polypeptides proteins Ribonucleic Acid (RNA) Ribosomes Semi-conservative model Silent	

						Thymine Transcription Translation Triplet Uracil	
	The science of biotechnology will have a large impact in the field of science.	How do biotechnologies impact the needs of medicine, forensics, and agriculture?	Tools of genetic engineering: Gel electrophoresis PCR Restriction enzymes Bacterial and viral plasmids Recombinant DNA Gene splicing Selective breeding Cloning DNA sequencing Applications of genetic engineering:	Describe the tools in genetic engineering. Describe the applications of genetic engineering. Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture.		Biotechnology Cloning DNA fingerprinting DNA sequencing Electrophoresis Gene splicing Gene therapy Genetic engineering Genetically modified organisms (GMO) Plasmids Polymerase chain reactions (PCR)	Standards 3.1.B.B4 4.4.7.A 4.4.10.A 4.4.12.A 4.4.7.B 4.4.10.B 4.4.12.B Eligible Content BIO.B. 2.4.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

			DNA fingerprinting Genetically modified organisms in medicine and agriculture Gene therapy Stem cell therapy Human genome project			Recombinant DNA Restricted enzymes Selective breeding Stem cell Transgenic organisms	
	Review Common Assessment Unit 8 DNA and Protein Synthesis Duration: 1 Day						
	Common Assessment Unit 8 DNA and Protein Synthesis Duration: 1 Day						
Unit 9 Theory of Evolution							
Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
20 Days	The theory of evolution describes the results of many natural processes that select for the survival and reproduction of a population.	How do natural processes as described by the theory of evolution effect change in population over time?	Principles of inheritance as they relate to evolution Fundamental principles of natural selection Types of natural selection: Directional,	Explain how natural selection can impact allele frequencies of a population. Describe the factors that can contribute to the development of		Populations Natural selection Allele frequency Species Fitness	Standards 3.1.B.B1 3.1.B.B3 3.1.B.B5 3.1.B.C1 3.1.B.C2 3.1.B.C3 3.1.B.C4 Eligible Content BIO.B.3.1.1

			stabilizing, Diversifying/disruptive Factors that contribute to speciation: isolating mechanisms, genetic drift, Founder effect, migration Types of genetic mutations and their impact on genotype and phenotype Examples of variations in population	the new species. Explain how genetic mutations may result in genotypic and phenotypic variations within the population		Adaption Variation Directional selection Stabilizing selection Diversifying /disruptive selection Speciation Isolating Mechanisms Genetic drifts Founder effect Migration Genotype Phenotype Mutation Variation	BIO.B.3.1.2 BIO.B.3.1.3 BIO.B.3.2.1 BIO.B.3.3.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	The theory of evolution describes the results of many natural processes that	How do natural processes as described by the theory of evolution effect change in	Evidence of evolution: - Fossil - Anatomical - Physiological - Embryological - Biochemical	Interpret evidence supporting the theory of evolution.		Evolution Fossil Fossil record	Standards 3.1.B.B1 3.1.B.B3 3.1.B.B5 3.1.B.C1 3.1.B.C2

	select for the survival and reproduction of a population.	population over time?	- Universal Genetic Code			Anatomical Physiological Embryological Biochemical Universal genetic code Homologous structures Analogous structures Vestigial structures Convergent evolution Divergent evolution	3.1.B.C3 3.1.B.C4 Eligible Content BIO.B.3.1.1 BIO.B.3.1.2 BIO.B.3.1.3 BIO.B.3.2.1 BIO.B.3.3.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	The theory of evolution describes the results of many natural processes that select for the survival and reproduction of a population.	How do natural processes as described by the theory of evolution effect change in population over time?	Scientific terms - Hypothesis and Prediction - Inference and observation - Principle - Theory - Law -Fact and Opinion	Use scientific terms on oral and written form		Hypothesis Prediction Inference Observation Principle Theory	Standard 3.1.B.A9 Eligible Content BIO.B.3.3.1 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G

						Law Fact and Opinion	CC.3.5.9-10H CC.3.5.9-10I
	Review Common Assessment Unit 9 Theory of Evolution Duration 1 Day						
	Common Assessment Unit 9 Theory of Evolution Duration 1 Day						
Unit 10 Ecology							
Estimated Length of Unit	**Big Ideas** (Understand)	**Essential Questions**	**Concepts** (Know)	**Competencies** (Do)	**Lesson Objectives and Suggested Resources**	**Vocabulary (Tier 3)**	**Standards and Eligible Content**
10 days	Ecology is the heart of life through the interactions of organisms with one another and their interrelationship with the environment.	How do organisms interact with and depend on each other in an ecosystem? How are organisms impacted by the nonliving components of an ecosystem?	The levels of ecological organization: -organism -population -community -ecosystem -biome -biosphere Abiotic components of an ecosystem Characteristic abiotic and biotic components of earth's aquatic and terrestrial ecosystems.	Describe and differentiate between the levels of ecological organization. Describe characteristic abiotic components of terrestrial and aquatic ecosystems.		Organism Population Community Ecosystem Biome Biosphere Biotic Aquatic ecosystem Terrestrial ecosystem	Standards 3.1.B.A2 3.1.B.C1 4.1.3.A 4.1.4.A 4.1.4.B 4.1.4.C 4.1.10.A 4.2.10.A 4.4.3.C 4.4.5.C 4.4.6.A 4.5.3.D 4.1.7.A 4.1.7.C Eligible Content BIO.B.4.1.1 BIO.B.4.1.2

							Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I
	Ecology is the heart of life through the interactions of organisms with one another and their interrelationship with the environment.	How do organisms interact with and depend on each other in an ecosystem?	The ultimate energy source is the sun: Other energy sources of such energy are chemicals and heat. Photosynthesis and cellular respiration Structure and components of a food chain or food web Implications of the 10% rule/law (energy pyramids) Habitat and niche (fundamental and realized Symbiotic interactions within an ecosystem Biochemical cycles; -Water	Describe how energy flows through an ecosystem. Describe biotic interactions within an ecosystem. Describe the niche of an organism. Describe how matter recycles through an ecosystem. Describe how ecosystems change in response to natural and human disturbances.		Energy Autotroph Heterotroph Trophic level Food chain Food web Producer Consumer Omnivore Decomposer Herbivore Carnivore Ecological pyramid	Standards 3.1.B.A2 4.1.3.C 4.1.4.A 4.1.4.B 4.1.4.C 4.1.4.E 4.1.5.A 4.1.5.C 4.1.7.A 4.1.7.B 4.1.7.C 4.1.7.E 4.1.10.A 4.1.10.B 4.1.10.D 4.1.10.E 4.1.12.A 4.1.12.C 4.2.5.A 4.2.7.A 4.2.8.A 4.2.10.A 4.2.10.B 4.2.10.C 4.2.12.A

			-carbon cycle -oxygen cycle -nitrogen cycle Examples of natural disturbances affecting the ecosystem: Ecological succession Natural disasters Examples of human disturbances effecting the ecosystem: -human overpopulation -climate change Introduction of nonnative species -pollution -fires Effects of human and natural disturbances on ecosystem: - Loss of biodiversity -loss of habitat -Increase rate of extinction -disruption of natural biological cycles Carrying capacity Limiting factors -density dependent -density independent	Describe the effects of limiting factors on population dynamics and potential species extinction.		10% rule/law Photosynthesis Chemosynthesis Competition Predation Symbiosis Parasitism Commensalism Mutualism Fundamental niche Realized niche Water cycle Carbon cycle Oxygen cycle Nitrogen cycle Succession Extinction Evolution Biodiversity	4.2.12.B 4.2.12.C 4.3.4.D 4.3.12.A 4.3.4.C 4.4.5.C 4.4.6.A 4.4.6.B 4.5.3.D 4.5.4.C 4.5.5.D 4.5.6.D 4.5.7.B 4.5.7.C 4.5.8.C 4.5.10.B 4.5.10.D 4.5.12.B Eligible Content BIO.B.4.2.1 BIO.B.4.2.2 BIO.B.4.2.3 BIO.B.4.2.4 BIO.B.4.2.5 Acad. Stand. for Reading in Science and Tech. CC.3.5.9-10A CC.3.5.9-10B CC.3.5.9-10C CC.3.5.9-10D CC.3.5.9-10E CC.3.5.9-10G CC.3.5.9-10H CC.3.5.9-10I

			Effects of limiting factors on population dynamics -Biotic potential -environmental resistance -Increase/decrease/ stabilized population growth -Extinction -Increase/decrease/ Stabilized biodiversity growth			Nonnative species Carrying capacity Limiting factors Density dependent Density independent Extinction Biotic potential Biodiversity	
	Review Common Assessment Unit 10 Ecology Duration: 1 Day						
	Common Assessment Unit 10 Ecology Duration: 1 Day						
During the course of the year, we will have at least 6 days scheduled for the Classroom Diagnostic Tool for this course. Since these dates have not been scheduled, there may need to be an adjustment to the day to day schedule when these dates are scheduled in. Also there needs to be 4 days built in for the PSSA or Keystone Exams. These 10 days will be distributed throughout the year thus totaling 180 instructional days.							