

Unit Number: Unit 1 – Basic Biological Principles

Course Time Prior to keystones: 5%

Overview: This unit examines the characteristics common to all organisms, the relationship between structure and function and the levels of biological organization in multicellular organisms.

Unit Essential Questions: What are the characteristics that all living things have in common? What is the difference between a prokaryote and eukaryote? How is structure related to function at various levels of cellular organization?

Keystone Content Module/Assessment Anchor: Module A – Cells & Cell Processes / BIO.A.1 – Basic Biological Principles

Keystone Eligible Content: BIO.A.1.1.1, BIO.A.1.2.1, BIO.A.1.2.2

Pennsylvania Common Core Standard(s): WRITING: CC.3.6.9.-10.B., CC.3.6.9-10.C, CC.3.6.9-10.D, CC.3.6.9-10.E, CC.3.6.9-10.H, CC.3.6.9-10.I READING: CC.3.5.9-10A., CC.3.5.9-10.B., CC.3.5.9-10.C, CC.3.5.9-10.D, CC.3.5.9-10.E, CC.3.5.9-10.F, CC.3.5.9-10.G, CC.3.5.9-10.J

National Common Core Standard(s): RST.9-10.1, RST.9-10.2, RST.9-10.4, RST.9-10.5, RST.9-10.7, RST.9-10.10, WHST.9-10.2, WHST.9-10.4, WHST.9-10.5, WHST.9-10.6, WHST.9-10.10

ISTE Standards: 1A, 1B, 1C, 1D, 2A, 2B, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C

Career Education and Work Standards:

Connecting to Common Core and Other Standards:

PA Standards found at <http://www.pdesas.org/standard/commoncore>

National Common Core found at www.corestandards.org

ISTE found at www.iste.org/standards/nets-for-students.aspx

Career Education and Work found at www.pacareerstandards.com/

*See Appendix for complete documents.

ELL Differentiation:

Generic found at <http://www.esasd.net/esl>

Science resources for ESL students found at <http://www.canby.com/hemphill/fyispn1.htm>

Enrichment: Study Island Biology Keystone Materials – www.studyisland.com using district provided login information

Remediation: Study Island Biology Keystone Materials – www.studyisland.com using district provided login information

IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
BIO.A.1.1.1 BIO.A.1.2.1 BIO.A.1.2.2	<ul style="list-style-type: none"> • Common characteristics of life: <ul style="list-style-type: none"> ○ composed of one or more units called cells ○ obtain and use matter and energy to carry out their life processes ○ reproduce and pass their genetic material on to the next generation ○ maintain homeostasis ○ grow, develop and eventually die ○ detect and respond to stimuli ○ adapt and evolve at the population level • Similarities and differences in structure between prokaryotic and eukaryotic cells • Common features/functions of cell structures in both prokaryotic and eukaryotic cells • Levels of biological organization from organelle to multicellular organism <ul style="list-style-type: none"> ○ Organelle ○ Cell ○ Tissue ○ Organ ○ Organ System ○ Multicellular Organism • Relationship between form and function 	<ul style="list-style-type: none"> • Describe the common characteristics exhibited by all living things – both prokaryotic and eukaryotic. • Compare cellular structures and their functions in 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 	<ul style="list-style-type: none"> • adapt • cell • eukaryotic • evolve • multicellular organism • organ • organ system • organelle • population • prokaryotic • stimuli • tissue • unicellular 	<ul style="list-style-type: none"> -Notes on Characteristics of Life -Notes on Prokaryotes and Eukaryotes -Notes on Eukaryotic Cell Parts -Notes on Differentiation and Stem Cell 	<ul style="list-style-type: none"> -Weekly cumulative vocabulary quiz -Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions -Course Midterm & Final Exam -Classwork & Homework checked by teacher -Keystone Biology Exam

East Stroudsburg Area School District
Biology Keystone Remediation – 001

- BIO.A.1.1.1** Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms.
- BIO.A.1.2.1** Compare cellular structures and their functions in prokaryotic and eukaryotic cells.
- BIO.A.1.2.2** Describe and interpret relationships between structure and function at various levels of biological organization (i.e. organelles, cells, tissues, organs, organ systems, and multicellular organisms).

Unit Number: Unit 2 – The Chemical Basis For Life

Course Time Prior to keystones: 15%

Overview: This unit reviews the unique properties of water and how these properties support life on Earth. Also, the structure and function of biological macromolecules, and enzyme action.

Unit Essential Questions: How are living things dependent on the properties of water and the biological macromolecules of life?

Keystone Content Module/Assessment Anchor: Module A – Cells & Cell Processes / BIO.A.2 – The Chemical Basis For Life

Keystone Eligible Content: BIO.A.2.1.1, BIO.A.2.2.1, BIO.A.2.2.2, BIO.A.2.2.3, BIO.A.2.3.1, BIO.A.2.3.2

Pennsylvania Common Core Standard(s): WRITING: CC.3.6.9.-10.B., CC.3.6.9-10.C, CC.3.6.9-10.D, CC.3.6.9-10.E, CC.3.6.9-10.H, CC.3.6.9-10.I READING: CC.3.5.9-10A., CC.3.5.9-10.B., CC.3.5.9-10.C, CC.3.5.9-10.D, CC.3.5.9-10.E, CC.3.5.9-10.F, CC.3.5.9-10.G, CC.3.5.9-10.J

National Common Core Standard(s): RST.9-10.1, RST.9-10.2, RST.9-10.4, RST.9-10.5, RST.9-10.7, RST.9-10.10, WHST.9-10.2, WHST.9-10.4, WHST.9-10.5, WHST.9-10.6, WHST.9-10.10

ISTE Standards: 1A, 1B, 1C, 1D, 2A, 2B, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C

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East Stroudsburg Area School District
Biology Keystone Remediation – 002

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
BIO.A.2.1.1 BIO.A.2.2.1 BIO.A.2.2.2 BIO.A.2.2.3 BIO.A.2.3.1 BIO.A.2.3.2	<ul style="list-style-type: none"> • Describe the unique properties of water and how they impact living things. <ul style="list-style-type: none"> ○ Cohesion ○ Adhesion ○ Capillarity ○ Freezing/melting pts. • Describe the versatility of carbon and its ability to form 4 different organic macromolecules. • Describe the relationship between monomers and polymers. • Review the structure and function of the 4 organic macromolecules: <ul style="list-style-type: none"> ○ Carbohydrates ○ proteins ○ lipids ○ nucleic acids • Review the role of an enzyme in biochemical reactions. • Analyze the effects of pH, temperature and concentration levels on enzyme function. 	<ul style="list-style-type: none"> • Describe the unique properties of water. • Explain how the unique properties of water make life possible on earth. • Describe the structure & versatility of a carbon atom. • Describe how biological macromolecules form from monomers. • Compare & contrast the structure and function of carbohydrates, proteins, lipids and nucleic acids. • Explain the role of an enzyme in biochemical reactions. • Predict the effects of the following environmental factors on the function of enzymes (pH, concentration, temp.) • Construct/interpret graphs to analyze enzyme action. 	<ul style="list-style-type: none"> • Activation energy • Active site • Adhesion • Amino acid • Buffer • Capillary action • Carbohydrates • Catalyst • Cohesion • Concentration • Dehydration synthesis • Enzyme • Hydrogen bond • Hydrolysis • Lipids • Macromolecule • Monomer • Monosaccharide • Nucleic acids • Nucleotide • pH • polarity • polymer • properties • proteins • reaction rate • substrate • surface tension • transpiration • universal solvent • organic 	<ul style="list-style-type: none"> • Macromolecule presentation • Study Island • Enzyme Web-based lab • Water Chemistry Notes 	<ul style="list-style-type: none"> -Weekly cumulative vocabulary quiz -Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions -Course Midterm & Final Exam -Classwork & Homework checked by teacher -Keystone Biology Exam

- BIO.A.2.1.1** Describe the unique properties of water and how these properties support life on Earth (e.g., freezing point, high specific heat, cohesion).
- BIO.A.2.2.1** Explain how carbon is uniquely suited to form biological macromolecules.
- BIO.A.2.2.2** Describe how biological macromolecules form from monomers.
- BIO.A.2.2.3** Compare the structure and function of carbohydrates, lipids, proteins, and nucleic acids in organisms.
- BIO.A.2.3.1** Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction.
- BIO.A.2.3.2** Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.

Unit Number: Unit 3 – Bioenergetics

Course Time Prior to Keystones: 25%

Overview: This unit reviews energy flow through organisms as it relates to photosynthesis and respiration.

Unit Essential Questions: What is the mechanism by which organisms carry out photosynthesis and respiration? What is the relationship between photosynthesis and respiration as it pertains to the flow of energy?

Keystone Content Module/Assessment Anchor: Module A – Cells & Cell Processes / BIO.A.3 – Bioenergetics

Keystone Eligible Content: BIO.A.3.1.1, BIO.A.3.2.1, BIO.A.3.2.2

Pennsylvania Common Core Standard(s): WRITING: CC.3.6.9.-10.B., CC.3.6.9-10.C, CC.3.6.9-10.D, CC.3.6.9-10.E, CC.3.6.9-10.H, CC.3.6.9-10.I READING: CC.3.5.9-10A., CC.3.5.9-10.B., CC.3.5.9-10.C, CC.3.5.9-10.D, CC.3.5.9-10.E, CC.3.5.9-10.F, CC.3.5.9-10.G, CC.3.5.9-10.J

National Common Core Standard(s): RST.9-10.1, RST.9-10.2, RST.9-10.4, RST.9-10.5, RST.9-10.7, RST.9-10.10, WHST.9-10.2, WHST.9-10.4, WHST.9-10.5, WHST.9-10.6, WHST.9-10.10

ISTE Standards: 1A, 1B, 1C, 1D, 2A, 2B, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C

Career Education and Work Standards:

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ELL Differentiation:

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East Stroudsburg Area School District
Biology Keystone Remediation – 003

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
BIO.A.3.1.1, BIO.A.3.2.1, BIO.A.3.2.2	<ul style="list-style-type: none"> • Processes of photosynthesis and respiration as it relates to energy transformation. • Structure & function of ATP molecules. • Structure & function of chloroplasts and mitochondria. • Relationship between photosynthesis and cellular respiration. 	<ul style="list-style-type: none"> • Relate the structure of mitochondria & chloroplasts to their function. • Describe the role of mitochondria and chloroplasts in energy transformation. • Compare & contrast the energy transformation that takes place during photosynthesis and cellular respiration. • Review the structure of ATP and its role in biochemical reactions. • Infer the energy transformation taking place in a given scientific scenario. 	<ul style="list-style-type: none"> • Adenosine diphosphate (ADP) • Adenosine triphosphate (ATP) • Cellular Respiration • Chemical Energy • Energy • Chloroplast • Energy Transformation • Metabolism • Mitochondrion • Photosynthesis • Plastids • Biochemical Reaction 	<ul style="list-style-type: none"> • Photosynthesis Review • Respiration Resource w/ practice questions 	<ul style="list-style-type: none"> -Weekly cumulative vocabulary quiz -Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions -Course Midterm & Final Exam -Classwork & Homework checked by teacher -Keystone Biology Exam

- BIO.A.3.1.1** Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in energy transformations
- BIO.A.3.2.1** Compare the basic transformation of energy during photosynthesis and cellular respiration.
- BIO.A.3.2.2** Describe the role of ATP in biochemical reactions.

Unit Number: Unit 4 – Homeostasis & Transport

Course Time Prior to Keystones: 35%

Overview: This unit reviews the structures and mechanisms involved in the transport of materials across plasma membranes and the resulting effects on homeostasis in living things.

Unit Essential Questions: How is homeostasis maintained through the transport of substances across the plasma membrane?

Keystone Content Module/Assessment Anchor: Module A – Cells & Cell Processes / BIO.A.4 – Homeostasis & Transport

Keystone Eligible Content: BIO.A.4.1.1, BIO.A.4.1.2, BIO.A.4.1.3, BIO.A.4.2.1

Pennsylvania Common Core Standard(s): WRITING: CC.3.6.9.-10.B., CC.3.6.9-10.C, CC.3.6.9-10.D, CC.3.6.9-10.E, CC.3.6.9-10.H, CC.3.6.9-10.I READING: CC.3.5.9-10A., CC.3.5.9-10.B., CC.3.5.9-10.C, CC.3.5.9-10.D, CC.3.5.9-10.E, CC.3.5.9-10.F, CC.3.5.9-10.G, CC.3.5.9-10.J

National Common Core Standard(s): RST.9-10.1, RST.9-10.2, RST.9-10.4, RST.9-10.5, RST.9-10.7, RST.9-10.10, WHST.9-10.2, WHST.9-10.4, WHST.9-10.5, WHST.9-10.6, WHST.9-10.10

ISTE Standards: 1A, 1B, 1C, 1D, 2A, 2B, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C

Career Education and Work Standards:

Connecting to Common Core and Other Standards:

PA Standards found at <http://www.pdesas.org/standard/commoncore>

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ELL Differentiation:

Generic found at <http://www.esasd.net/esl>

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East Stroudsburg Area School District
Biology Keystone Remediation – 004

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
BIO.A.4.1.1, BIO.A.4.1.2, BIO.A.4.1.3, BIO.A.4.2.1	<ul style="list-style-type: none"> • Structure & function of the plasma membrane. <ul style="list-style-type: none"> ○ Fluid mosaic model ○ Phospholipid bilayer ○ Selectively Permeable • Transport Mechanisms: <ul style="list-style-type: none"> ○ Active Transport <ul style="list-style-type: none"> ▪ Membrane pumps ▪ Endocytosis ▪ Exocytosis ○ Passive Transport <ul style="list-style-type: none"> ▪ Diffusion ▪ Osmosis ▪ Facilitated Diffusion • Intracellular transportation mechanisms involving the endoplasmic reticulum and the Golgi apparatus. • Link cellular transport mechanisms to maintenance of stable internal conditions (homeostasis) 	<ul style="list-style-type: none"> • Review the structure and function of the plasma membrane. • Compare & contrast passive and active transport mechanisms. • Describe the role of membrane-bound organelles in intracellular transport. • Relate all types of cellular transport mechanisms to the overall homeostasis of an organism. 	<ul style="list-style-type: none"> • Active transport • Carrier/transport protein • Concentration gradient • Diffusion • Endocytosis • Endoplasmic Reticulum • Equilibrium • Exocytosis • Facilitated Diffusion • Fluid Mosaic Model • Golgi Apparatus • Homeostasis • Intracellular transport • Osmosis • Passive Transport • Phospholipid Bilayer • Plasma Membrane • Pumps • Selectively Permeable 	<ul style="list-style-type: none"> • Plasma Membrane and Cellular Transport Overview • Quizlet – vocabulary review • Cellular Transport Interactive Animations • Passive Transport Animation • Transport Animation 	<ul style="list-style-type: none"> -Weekly cumulative vocabulary quiz -Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions -Course Midterm & Final Exam -Classwork & Homework checked by teacher -Keystone Biology Exam

- BIO.A.4.1.1** Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell.
- BIO.A.4.1.2** Compare the mechanisms that transport materials across the plasma membrane (i.e., passive transport – diffusion, osmosis, facilitated diffusion; and active transport – pumps, endocytosis, exocytosis).
- BIO.A.4.1.3** Describe how membrane-bound cellular organelles (e.g., endoplasmic reticulum, Golgi apparatus) facilitate the transport of materials within a cell.
- BIO.A.4.2.1** Explain how organisms maintain homeostasis (e.g., thermoregulation, water regulation, oxygen regulation).

Unit Number: Unit 5 – Cell Growth & Reproduction

Course Time Prior to keystones: 45%

Overview: This unit reviews the processes of mitosis and meiosis and their relationship to cell cycle and genetic inheritance.

Unit Essential Questions: What are the similarities and differences between mitosis and meiosis? How does meiosis relate to genetic inheritance?

Keystone Content Module/Assessment Anchor: Module B – Continuity & Unity of Life / BIO.B.1 – Cell Growth & Reproduction

Keystone Eligible Content: BIO.B.1.1.1, BIO.B.1.1.2, BIO.B.1.2.1, BIO.B.1.2.2

Pennsylvania Common Core Standard(s): WRITING: CC.3.6.9.-10.B., CC.3.6.9-10.C, CC.3.6.9-10.D, CC.3.6.9-10.E, CC.3.6.9-10.H, CC.3.6.9-10.I READING: CC.3.5.9-10A., CC.3.5.9-10.B., CC.3.5.9-10.C, CC.3.5.9-10.D, CC.3.5.9-10.E, CC.3.5.9-10.F, CC.3.5.9-10.G, CC.3.5.9-10.J

National Common Core Standard(s): RST.9-10.1, RST.9-10.2, RST.9-10.4, RST.9-10.5, RST.9-10.7, RST.9-10.10, WHST.9-10.2, WHST.9-10.4, WHST.9-10.5, WHST.9-10.6, WHST.9-10.10

ISTE Standards: 1A, 1B, 1C, 1D, 2A, 2B, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C

Career Education and Work Standards:

Connecting to Common Core and Other Standards:

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East Stroudsburg Area School District
Biology Keystone Remediation – 005

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
<p>BIO.B.1.1.1, BIO.B.1.1.2, BIO.B.1.2.1, BIO.B.1.2.2</p>	<ul style="list-style-type: none"> • The role of DNA and chromosomes in the cell cycle. • The stages of the cell cycle <ul style="list-style-type: none"> ○ Interphase: <ul style="list-style-type: none"> ▪ Gap 1 phase (G₁) ▪ Synthesis phase ▪ Gap 2 phase (G₂) ○ Mitosis & Cytokinesis • Process of DNA Replication • The process of meiosis and its role in gamete production. • The inheritance of genetic material made possible by the process of meiosis. 	<ul style="list-style-type: none"> • Review the relationship between DNA, chromatin, chromosomes, and chromatids. • Describe the events that occur during the cell cycle. • Compare & contrast mitosis and meiosis. • Describe processes that can alter composition or number of chromosomes. <ul style="list-style-type: none"> ○ Crossing-over ○ Nondisjunction ○ Independent assortment. • Review the process of DNA replication. 	<ul style="list-style-type: none"> • Anaphase • Asexual • Cell Cycle • Cell Plate • Centriole • Chromatin • Chromatid • Chromosomal Mutation • Chromosome • Cleavage Furrow • Crossing-Over • Cytokinesis • Daughter Cells • Diploid • Gametes • Haploid • Homologous Chromosomes • Independent Assortment • Interphase • Meiosis • Metaphase • Mitosis • Nondisjunction • Prophase • Sexual • Somatic Cells • Spindle fiber • Telophase • Tetrad • Zygote • Fertilization • Sperm 	<ul style="list-style-type: none"> • Cell Cycle Overview • Cancer Information • Biologycorner • Mitosis Microscopy • Meiosis Overview 	<p>-Weekly cumulative vocabulary quiz</p> <p>-Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions</p> <p>-Course Midterm & Final Exam</p> <p>-Classwork & Homework checked by teacher</p> <p>-Keystone Biology Exam</p>

East Stroudsburg Area School District
Biology Keystone Remediation – 005

			<ul style="list-style-type: none">• Egg• Oogenesis• Spermatogenesis• DNA Polymerase• Helicase		
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BIO.B.1.1.1 Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), cytokinesis.

BIO.B.1.1.2 Compare the processes and outcomes of mitotic and meiotic nuclear divisions.

BIO.B.1.2.1 Describe how the process of DNA replication results in the transmission and/or conservation of genetic information.

BIO.B.1.2.2 Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance.

Unit Number: Unit 6 – Genetics

Course Time Prior to Keystones: 55%

Overview: This unit reviews the functional relationships between DNA, genes, alleles and chromosomes and how observed patterns of inheritance and mathematical probability can be used to predict genotypes and phenotypes.

Unit Essential Questions: How are traits passed down from parents to offspring? What are the laws of genetic inheritance? How can probability be used to predict genetic outcomes? What are the impacts of chromosomal and DNA mutations on an organism? How do the processes of transcription and translation result in gene expression? How has genetic engineering impacted the fields of medicine, forensics and agriculture?

Keystone Content Module/Assessment Anchor: Module B – Continuity & Unity of Life / BIO.B.2 – Genetics

Keystone Eligible Content: BIO.B.2.1.1, BIO.B.2.1.2, BIO.B.2.2.1, BIO.B.2.2.2, BIO.B.2.3.1, BIO.B.2.4.1

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East Stroudsburg Area School District
Biology Keystone Remediation – 006

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
<p>BIO.B.2.1.1, BIO.B.2.1.2, BIO.B.2.2.1, BIO.B.2.2.2, BIO.B.2.3.1, BIO.B.2.4.1</p>	<ul style="list-style-type: none"> • Laws of Mendelian Inheritance. • Tools for predicting patterns of inheritance. <ul style="list-style-type: none"> ○ Probability ○ Punnett squares ○ Pedigrees • Relationship between genotype and phenotype. • Laws of Non-Mendelian inheritance <ul style="list-style-type: none"> ○ Incomplete dominance ○ Codominance ○ Sex-linked traits ○ Polygenic traits ○ Multiple alleles • Genetic mutations <ul style="list-style-type: none"> ○ Duplication ○ Translocation ○ Deletion ○ Insertion ○ Inversion • Processes of transcription and translation <ul style="list-style-type: none"> ○ Associated mutations <ul style="list-style-type: none"> ▪ Silent, nonsense, frameshift • Impacts of genetic engineering <ul style="list-style-type: none"> ○ Medicine 	<ul style="list-style-type: none"> • Review the functional relationships between DNA, genes, alleles and chromosomes and their roles in inheritance. • Describe and predict observed patterns of inheritance. • Predict the effects of chromosomal and genetic mutations. • Describe the processes of transcription and translation and their role in gene expression. • Predict the impacts of various forms of genetic engineering. 	<ul style="list-style-type: none"> • Selective Breeding • Gene Splicing • Cloning • Genetically Modified Organisms • Gene Therapy • Alleles • Chromosomes • Codominance • Dominant • DNA • Genes • Genetics • Genotype • Heterozygous/Hybrid • Homozygous/Pure • Incomplete Dominance • Multiple Alleles • Pedigree • Phenotype • Polygenic • Probability • Punnett Square • Recessive • Sex-linked • Test Cross • Offspring • First filial (F₁) • Inheritance 	<ul style="list-style-type: none"> • Genetics web-resource • Protein Synthesis • Genetics Interactive Animations & Videos 	<p>-Weekly cumulative vocabulary quiz</p> <p>-Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions</p> <p>-Course Midterm & Final Exam</p> <p>-Classwork & Homework checked by teacher</p> <p>-Keystone Biology Exam</p>

East Stroudsburg Area School District
Biology Keystone Remediation – 006

	<ul style="list-style-type: none">○ Forensics○ agriculture				
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- BIO.B.2.1.1** Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, codominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).
- BIO.B.2.1.2** Describe processes that can alter composition or number of chromosomes (i.e., crossing-over, nondisjunction, duplication, translocation, deletion, insertion, and inversion).
- BIO.B.2.2.1** Describe how the processes of transcription and translation are similar in all organisms.
- BIO.B.2.2.2** Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins.
- BIO.B.2.3.1** Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frameshift).
- BIO.B.2.4.1** Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy).

East Stroudsburg Area School District
Biology Keystone Remediation – 006

Unit Number: Unit 7 – The Theory of Evolution

Course Time Prior to keystones: 65%

Overview: This unit examines the natural processes explained by the theory of evolution and cites evidence that supports this theory.

Unit Essential Questions: How does evolution through the process of natural selection cause change in species? What are the major pieces of evidence that support the theory of evolution? How is a scientific theory developed?

Keystone Content Module/Assessment Anchor: Module B – Continuity & Unity of Life / BIO.B.3 – The Theory of Evolution

Keystone 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

Pennsylvania Common Core Standard(s): WRITING: CC.3.6.9.-10.B., CC.3.6.9-10.C, CC.3.6.9-10.D, CC.3.6.9-10.E, CC.3.6.9-10.H, CC.3.6.9-10.I READING: CC.3.5.9-10A., CC.3.5.9-10.B., CC.3.5.9-10.C, CC.3.5.9-10.D, CC.3.5.9-10.E, CC.3.5.9-10.F, CC.3.5.9-10.G, CC.3.5.9-10.J

National Common Core Standard(s): RST.9-10.1, RST.9-10.2, RST.9-10.4, RST.9-10.5, RST.9-10.7, RST.9-10.10, WHST.9-10.2, WHST.9-10.4, WHST.9-10.5, WHST.9-10.6, WHST.9-10.10

ISTE Standards: 1A, 1B, 1C, 1D, 2A, 2B, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C

Career Education and Work Standards:

Connecting to Common Core and Other Standards:

PA Standards found at <http://www.pdesas.org/standard/commoncore>

National Common Core found at www.corestandards.org

ISTE found at www.iste.org/standards/nets-for-students.aspx

Career Education and Work found at www.pacareerstandards.com/

*See Appendix for complete documents.

ELL Differentiation:

Generic found at <http://www.esasd.net/esl>

Science resources for ESL students found at <http://www.canby.com/hemphill/fyispn1.htm>

Enrichment: Study Island Biology Keystone Materials – www.studyisland.com using district provided login information

Remediation: Study Island Biology Keystone Materials – www.studyisland.com using district provided login information

IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

East Stroudsburg Area School District
Biology Keystone Remediation – 007

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
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	<ul style="list-style-type: none"> • The relationship between genetic inheritance and evolution. • The mechanisms of Speciation <ul style="list-style-type: none"> ○ Isolating Mechanisms ○ Genetic Drift ○ Founder Effect ○ Migration • The effect of genetic mutations on the frequency of genotypes and phenotypes within a population. • Evidence of Evolution <ul style="list-style-type: none"> ○ Fossil record ○ Anatomical ○ Physiological ○ Embryological ○ Biochemical ○ Universal Genetic Code • Scientific Process <ul style="list-style-type: none"> ○ Hypothesis ○ Inference ○ Observation ○ Evidence ○ Law ○ Theory ○ Principle ○ Fact 	<ul style="list-style-type: none"> • Explain how natural selection can impact allele frequencies within a population. • Review the factors that contribute to speciation. • Link genetic mutations to variations within a population. • Interpret evidence supporting the theory of evolution. • Describe the proper steps for developing a scientific theory. 	<ul style="list-style-type: none"> • Adaptation • Allele Frequency • Analogous Structure • Anatomical • Behavioral Isolation • Biochemical • Convergent Evolution • Directional Selection • Divergent Evolution • Disruptive Selective • Embryological • Fact • Fitness • Fossil Record • Founder Effect • Genetic Drift • Genotype • Geographic Isolation • Homologous Structures • Hypothesis • Inference • Isolating Mechanisms • Law • Migration 	<ul style="list-style-type: none"> • PBS Evolution Resource • Smithsonian • HHMI Evolution Interactive • Tree Of Life 	<ul style="list-style-type: none"> -Weekly cumulative vocabulary quiz -Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions -Course Midterm & Final Exam -Classwork & Homework checked by teacher -Keystone Biology Exam

East Stroudsburg Area School District
Biology Keystone Remediation – 007

			<ul style="list-style-type: none">• Mutation• Natural Selection• Observation• Opinion• Phenotype• Physiological• Population• Prediction• Principle• Reproductive Isolation• Speciation• Species• Stabilizing Selection• Temporal Isolation• Theory• Universal Genetic Code• Variation• Vestigial Structures		
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- BIO.B.3.1.1** Explain how natural selection can impact allele frequencies of a population.
- BIO.B.3.1.2** Describe the factors that can contribute to the development of new species (e.g., isolating mechanisms, genetic drift, founder effect, migration).
- BIO.B.3.1.3** Explain how genetic mutations may result in genotypic and phenotypic variations within a population.
- BIO.B.3.2.1** Interpret evidence supporting the theory of evolution (i.e., fossil, anatomical, physiological, embryological, biochemical, and universal genetic code).
- BIO.B.3.3.1** Distinguish between the scientific terms: hypothesis, inference, law, theory, principle, fact, and observation.

Unit Number: Unit 8 – Ecology

Course Time Prior to keystones: 75%

Overview: This unit examines interactions of organisms with one another and their interrelationship with the environment.

Unit Essential Questions: How do organisms interact with each other and the environment in an ecosystem?

Keystone Content Module/Assessment Anchor: Module B – Continuity & Unity of Life / BIO.B.4 – Ecology

Keystone Eligible Content: BIO.B.4.1.1, BIO.B.4.1.2, 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

Pennsylvania Common Core Standard(s): WRITING: CC.3.6.9.-10.B., CC.3.6.9-10.C, CC.3.6.9-10.D, CC.3.6.9-10.E, CC.3.6.9-10.H, CC.3.6.9-10.I
READING: CC.3.5.9-10A., CC.3.5.9-10.B., CC.3.5.9-10.C, CC.3.5.9-10.D, CC.3.5.9-10.E, CC.3.5.9-10.F, CC.3.5.9-10.G, CC.3.5.9-10.J

National Common Core Standard(s): RST.9-10.1, RST.9-10.2, RST.9-10.4, RST.9-10.5, RST.9-10.7, RST.9-10.10, WHST.9-10.2, WHST.9-10.4, WHST.9-10.5, WHST.9-10.6, WHST.9-10.10

ISTE Standards: 1A, 1B, 1C, 1D, 2A, 2B, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C

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Remediation: Study Island Biology Keystone Materials – www.studyisland.com using district provided login information

IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

East Stroudsburg Area School District
Biology Keystone Remediation – 008

PSSA Anchors & Eligible Content	Unit Concepts What students need to know	Unit Competencies What students need to be able to do (skills): (Students will:)	Content Vocabulary	Materials, Resources, & Instructional Activities	Assessments
BIO.B.4.1.1, BIO.B.4.1.2, 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	<ul style="list-style-type: none"> • Levels of organization within an ecosystem <ul style="list-style-type: none"> ○ Organism ○ Population ○ Community ○ Ecosystem ○ Biome ○ Biosphere • Abiotic and biotic components of both aquatic and terrestrial ecosystems • Energy flow through an ecosystem <ul style="list-style-type: none"> ○ Food chain ○ Food web ○ Energy pyramid • Interactions between organisms in an ecosystem <ul style="list-style-type: none"> ○ Competition ○ Predation ○ Symbiosis • Recycling of matter through an ecosystem <ul style="list-style-type: none"> ○ Water Cycle ○ Carbon Cycle ○ Oxygen Cycle ○ Nitrogen Cycle 	<ul style="list-style-type: none"> • Review the levels of organization within an ecosystem • Identify and describe the abiotic and biotic components of terrestrial and aquatic ecosystems and their interactions • Describe how energy flows through an ecosystem • Review how matter is recycled in an ecosystem • Explain how ecosystems change in response to natural and human disasters • Describe the effects of limiting factors on population dynamics and potential species extinction 	<ul style="list-style-type: none"> • 10% rule • Abiotic • Aquatic Ecosystem • Autotroph • Biodiversity • Biome • Biosphere • Biotic • Biotic Potential • Carbon Cycle • Carnivore • Carrying Capacity • Chemosynthesis • Commensalism • Community • Competition • Consumer • Decomposer • Density Dependent • Density Independent • Ecological Pyramid • Ecosystem • Energy • Extinction • Food Chain • Food Web • Niche • Herbivore • Heterotroph • Limiting Factors • Mutualism 	<ul style="list-style-type: none"> • The Habitable Planet • BiologyCorner resources • Ecology Overview 	<p>-Weekly cumulative vocabulary quiz</p> <p>-Unit Test in Keystone format to include 15 Multiple Choice and 2 Constructed Response Questions</p> <p>-Course Midterm & Final Exam</p> <p>-Classwork & Homework checked by teacher</p> <p>-Keystone Biology Exam</p>

East Stroudsburg Area School District
Biology Keystone Remediation – 008

	<ul style="list-style-type: none"> • Response of ecosystems to natural and human disturbances <ul style="list-style-type: none"> ○ Climate change ○ Nonnative species ○ Pollution ○ Fires ○ Natural Disasters • Effects of limiting factors on population dynamics and potential species extinction 		<ul style="list-style-type: none"> • Nitrogen Cycle • Nonnative species • Omnivore • Organism • Oxygen Cycle • Parasitism • Photosynthesis • Population • Predation • Producer • Succession • Symbiosis • Terrestrial Ecosystem • Trophic Level • Water Cycle 		
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BIO.B.4.1.1 Describe the levels of ecological organization (i.e., organism, population, community, ecosystem, biome, and biosphere).

BIO.B.4.1.2 Describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.

BIO.B.4.2.1 Describe how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).

BIO.B.4.2.2 Describe biotic interactions in an ecosystem (e.g., competition, predation, symbiosis).

BIO.B.4.2.3 Describe how matter recycles through and ecosystem (i.e., water cycle, carbon cycle, oxygen cycle, and nitrogen cycle).

BIO.B.4.2.4 Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of nonnative species, pollution, fires).

BIO.B.4.2.5 Describe the effects of limiting factors on population dynamics and potential species extinction.

East Stroudsburg Area School District
Biology Keystone Remediation – 008