Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Applied Biology

Course Number: 00311

Course Prerequisites:

Course Description: (Include "no final exam" or "final exam required")
Applied Biology is recommended for 10th grade students who have successfully completed Introduction to Earth and Environmental Sciences in their ninth grade year. The course focuses on the study of biochemistry, cells, genetics, evolution and biological diversity. Appropriate lab activities will be used including elements of scientific inquiry, concepts of models and the use of technological devices. All areas of study will focus on meeting the requirements of the Keystone Anchors and Common Core Standards.

Suggested Grade Level: 10

Length of Course: _____ One Semester X Two Semesters _____ Other (Describe)

Units of Credit: 1 (Insert ***NONE*** if appropriate.)

PDE *Certification and Staffing Policies and Guidelines (CSPG)* Required Teacher Certification(s) (Insert certificate title and CSPG#) Biology

Certification verified by WCSD Human Resources Department:
X Yes _____ No

Board Approved Textbooks, Software, Materials:
Title: Biology, Core Edition
Publisher: Prentice Hall
ISBN #: 0-13-369011-3
Copyright Date: 2010
Date of WCSD Board Approval: 4/12/10

BOARD APPROVAL:

Date Written: October 2012

Date Approved:_____

Implementation Year: 2012-2013

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

SPECIFIC EDUCATIONAL STANDARDS, ESSENTIAL QUESTIONS, CONTENT, & SKILLS

Keystone Anchors – BIO; **Common Core** – Reading: RST, Writing: WHST **Year:** 2012-13

Course: Academic Biology **Month:** All Months

August

Nature of Science

Standards	Essential Questions	Content	Skills	Resources
RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9â€“10 texts and topics. RST.9.9-Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. WHST.9-10.1.a-Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. WHST.9-10.1.e-Provide a concluding statement or section that follows from or supports the argument presented. WHST.9-10.4-Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	• What role does science play in the study of life?	• Scientific method • Observations and inferences • Quantitative and qualitative data • Data analysis and graphic interpretation	• Use the scientific method to solve a problem • Explain how scientific theories develop • Explain how scientific attitudes develop new ideas	Website: Pearson Success Net Textbook: **Biology,** Miller and Levine

September

The Chemistry of Living Things

Standards	Essential Questions	Content	Skills	Resources
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-Explain how enzymes regulate biochemical reactions within a cell. 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. RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9â€“10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). RST.9.7-Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. RST.9.10-By the end of grade 10, read and comprehend science/technical texts in the grades 9 and 10 text complexity band independently and proficiently. WHST.9-10.2.a-Introduce a topic and organize ideas, concepts,	• What are the basic chemical principles that affect living things?	• Properties of water • Chemical Bonding • Macromolecules • Enzymes	• Explain how the structure of water is responsible for its unique properties. • Relate carbon's bonding versatility to its ability to form biological macromolecules. • Describe the processes of dehydration synthesis and hydrolysis. • Differentiate between the structures and functions of carbohydrates, proteins, lipids and nucleic acids. • Investigate the presence of specific molecules in food and the effects of environmental factors on enzyme activities. • Describe the role of catalysts in chemical reactions and identify	Website: Pearson Success Net Textbook: **Biology**, Miller and Levine

	and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. WHST.9-10.2.b-Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.			• enzymes as biological catalysts. • Explain the induced fit model of enzyme.	
October	**Cells**				
	Standards	**Essential Questions**	**Content**	**Skills**	**Resources**
	BIO.A.3.1-Identify and describe the cell structures involved in processing energy. BIO.A.3.1.1-Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in energy transformations. BIO.A.3.2-Identify and describe how organisms obtain and transform energy for their life processes. 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. BIO.A.4.1-Identify and describe the cell structures involved in transport of materials into, out of, and throughout a cell. 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 transportâ€"diffusion, osmosis, facilitated diffusion; and active transportâ€"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-Explain mechanisms that permit organisms to maintain biological balance between their internal and external environments. BIO.A.4.2.1-Explain how organisms maintain homeostasis	• How are cell structures adapted to their functions? • How do plants and other organisms capture energy from the sun? • How do organisms obtain energy?	• Types of Cells • Cell Organelles • Cell Membranes and Homoeostasis • Microscopy • Hierarchy of Organization • Photosynthesis • Respiration	• Observe bacteria cells under a microscope. • Build a model of a typical prokaryotic cell. • Describe the function of each structure in a prokaryotic cell. • Compare and contrast a prokaryotic cell with a eukaryotic cell. • Compare and contrast a typical plant cell with a typical animal cell. • Write an analogy for the function of each of the organelles found in a eukaryotic	Website: Pearson Success net Textbook: **Biology**, Miller and Levine

	(e.g., thermoregulation, water regulation, oxygen regulation). RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). RST.9.7-Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. WHST.9-10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claims) and reasons, between reasons and evidence, and between claim(s) and counterclaims. WHST.9-10.2.a-Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.			cell. • Describe how the biological levels of organization are arranged in increasing order • Relate the structures of membrane-bound organelles to their functions in energy transfer and transportation of materials. • Describe the role of the plasma membrane in regulating cell activities and protecting the cell. • Describe the role of ATP in photosynthesis, cell respiration, and active transport. • Compare energy transfer during photosynthesis and cell respiration. • Compare the various mechanisms of passive and active transport	

November

Cells Continued

Standards	Essential Questions	Content	Skills	Resources
BIO.A.3.1-Identify and describe the cell structures involved in processing energy. BIO.A.3.1.1-Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in energy transformations. BIO.A.3.2-Identify and describe how organisms obtain and transform energy for their life processes. 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. BIO.A.4.1-Identify and describe the cell structures involved in transport of materials into, out of, and throughout a cell. 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-Explain mechanisms that permit organisms to maintain biological balance between their internal and external environments. BIO.A.4.2.1-Explain how organisms maintain homeostasis (e.g., thermoregulation, water regulation, oxygen regulation). RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when	• How are cell structures adapted to their functions? • How do plants and other organisms capture energy from the sun? • How do organisms obtain energy?	• Types of Cells • Cell Organelles • Cell Membranes and Homoeostasis • Microscopy • Hierarchy of Organization • Photosynthesis • Respiration	• Observe bacteria cells under a microscope. • Build a model of a typical prokaryotic cell. • Describe the function of each structure in a prokaryotic cell. • Compare and contrast a prokaryotic cell with a eukaryotic cell. • Compare and contrast a typical plant cell with a typical animal cell. • Write an analogy for the function of each of the organelles found in a eukaryotic cell. • Describe how the biological levels of organization are arranged in increasing order • Relate the structures of membrane-bound	Website: Pearson Success Net Textbook: **Biology**, Miller and Levine

	carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). RST.9.7-Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. WHST.9-10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claims) and reasons, between reasons and evidence, and between claim(s) and counterclaims. WHST.9-10.2.a-Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.			organelles to their functions in energy transfer and transportation of materials. • Describe the role of the plasma membrane in regulating cell activities and protecting the cell. • Describe the role of ATP in photosynthesis, cell respiration, and active transport. • Compare energy transfer during photosynthesis and cell respiration. • Compare the various mechanisms of passive and active transport.	

December

Cell Growth and Division

Standards	Essential Questions	Content	Skills	Resources
BIO.B.1.1-Describe the three stages of the cell cycle: interphase, nuclear division, cytokinesis. 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-Explain how genetic information is inherited. BIO.B.1.2.2-Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance. RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). WHST.9-10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claims) and reasons, between reasons and evidence, and between claim(s) and counterclaims. WHST.9-10.1.d-Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. WHST.9-10.2.c-Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.	• How do cells reproduce? • What is the relationship between DNA, genes and chromosomes? • How is the cell cycle regulated? • How do mitosis and meiosis differ?	• DNA/RNA • Genes and chromosomes • Mitosis/Meiosis • Limits to cell size • Regulation of the cell cycle	• Identify and describe the three main stages in the cell cycle. • Identify the changes and events that occur in cells before and during mitosis. • Identify the changes and events that occur in cells during meiosis. • Differentiate between mitosis and meiosis. • Create a model to demonstrate the process of mitosis or meiosis. • Calculate surface area to volume ratio and explain how it limits cell size • Explain how cancer cells differ from normal cells	Website: Pearson Success Net Textbook: Biology, Miller and Levine

January

Genetics

Standards	Essential Questions	Content	Skills	Resources
BIO.B.2.1-Compare Mendelian and non-Mendelian patterns of inheritance. BIO.B.2.1.1-Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles). BIO.B.2.2-Explain the process of protein synthesis (i.e., transcription, translation, and protein modification). 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-Explain how genetic information is expressed. BIO.B.2.3.1-Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frame-shift). RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms	• How does biological information pass from one generation to another? • What is the structure of DNA and how does it function in genetic inheritance? • How does information flow from DNA to RNA to direct the synthesis of proteins? • How can we use genetics to study human inheritance? • How and why do scientists manipulate DNA in living cells?	• Mendelian genetics • Reproductive patterns and selective breeding • Types of inheritance • Protein synthesis • Recombinant DNA • DNA analysis • Transgenic Organisms • Gene therapy • Bioethics	• Determine the relationship between alleles and genes. • Describe and predict various patterns of inheritance. • Summarize the events of DNA replication and explain the result of replication. • Explain the roles of DNA, genes, alleles, and chromosomes in inheritance. • Compare and contrast Mendelian and non-Mendelian patterns of inheritance. • Explain the processes of transcription, translation, and protein modification • Identify and explain how genetic information is	Website: Pearson Success net Textbook: **Biology**, Miller and Levine

	(e.g., force, friction, reaction force, energy). RST.9.7-Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. RST.9.10-By the end of grade 10, read and comprehend science/technical texts in the grades 9 & 10 text complexity band independently and proficiently. WHST.9-10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claims) and reasons, between reasons and evidence, and between claim(s) and counterclaims. WHST.9-10.2-Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.9-10.2.a-Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. WHST.9-10.2.b-Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. WHST.9-10.2.d-Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.			expressed • Explore the relationships between advancements in technology and innovative biological studies.	

Feb ruary

Genetics Continued

Standards	Essential Questions	Content	Skills	Resources
BIO.B.2.1-Compare Mendelian and non-Mendelian patterns of inheritance. BIO.B.2.1.1-Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles). BIO.B.2.2-Explain the process of protein synthesis (i.e., transcription, translation, and protein modification). 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-Explain how genetic information is expressed. BIO.B.2.3.1-Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frame-shift). RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms	• How does biological information pass from one generation to another? • What is the structure of DNA and how does it function in genetic inheritance? • How does information flow from DNA to RNA to direct the synthesis of proteins? • How can we use genetics to study human inheritance? • How and why do scientists manipulate DNA in living cells?	• Mendelian genetics • Reproductive patterns and selective breeding • Types of inheritance • Protein synthesis • Recombinant DNA • DNA analysis • Transgenic Organisms • Gene therapy • Bioethics	• Determine the relationship between alleles and genes. • Describe and predict various patterns of inheritance. • Summarize the events of DNA replication and explain the result of replication. • Explain the roles of DNA, genes, alleles, and chromosomes in inheritance. • Compare and contrast Mendelian and non-Mendelian patterns of inheritance. • Explain the processes of transcription, translation, and protein modification • Identify and explain how genetic information is	Website: Pearson Success net Textbook: **Biology**, Miller and Levine

	(e.g., force, friction, reaction force, energy). RST.9.7-Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. RST.9.10-By the end of grade 10, read and comprehend science/technical texts in the grades 9 & 10 text complexity band independently and proficiently. WHST.9-10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claims) and reasons, between reasons and evidence, and between claim(s) and counterclaims. WHST.9-10.2-Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.9-10.2.a-Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. WHST.9-10.2.b-Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. WHST.9-10.2.d-Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.			expressed • Explore the relationships between advancements in technology and innovative biological studies.	

March

Genetics Continued

Standards	Essential Questions	Content	Skills	Resources
BIO.B.2.1-Compare Mendelian and non-Mendelian patterns of inheritance. BIO.B.2.1.1-Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles). BIO.B.2.2-Explain the process of protein synthesis (i.e., transcription, translation, and protein modification). 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-Explain how genetic information is expressed. BIO.B.2.3.1-Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frame-shift). RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms	• How does biological information pass from one generation to another? • What is the structure of DNA and how does it function in genetic inheritance? • How does information flow from DNA to RNA to direct the synthesis of proteins? • How can we use genetics to study human inheritance? • How and why do scientists manipulate DNA in living cells?	• Mendelian genetics • Reproductive patterns and selective breeding • Types of inheritance • Protein synthesis • Recombinant DNA • DNA analysis • Transgenic Organisms • Gene therapy • Bioethics	• Determine the relationship between alleles and genes. • Describe and predict various patterns of inheritance. • Summarize the events of DNA replication and explain the result of replication. • Explain the roles of DNA, genes, alleles, and chromosomes in inheritance. • Compare and contrast Mendelian and non-Mendelian patterns of inheritance. • Explain the processes of transcription, translation, and protein modification • Identify and explain how genetic information is	Website: Pearson Success net Textbook: **Biology**, Miller and Levine

	(e.g., force, friction, reaction force, energy). RST.9.7-Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. RST.9.10-By the end of grade 10, read and comprehend science/technical texts in the grades 9 & 10 text complexity band independently and proficiently. WHST.9-10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claims) and reasons, between reasons and evidence, and between claim(s) and counterclaims. WHST.9-10.2-Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.9-10.2.a-Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. WHST.9-10.2.b-Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. WHST.9-10.2.d-Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.			expressed • Explore the relationships between advancements in technology and innovative biological studies.	

April

Evolution

Standards	Essential Questions	Content	Skills	Resources
BIO.B.3.1-Explain the mechanisms of evolution. 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-Analyze the sources of evidence for biological evolution. 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-Apply scientific thinking, processes, tools, and technologies in the study of the theory of evolution. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). RST.9.6-Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	• What is *Natural Selection*? • How can a population evolve to form new species?	• Evidence of evolution • Natural selectin and genetic drift • Mutations and gene recombination • Speciation	• Conduct a laboratory investigation on how natural selection can affect allele frequencies of a population. • Describe the mechanisms that lead to the development of new species. • Explain how genetic mutations can result in changes in a population's genotypes and phenotypes.	Website: Pearson Success Net Textbook: **Biology,** Miller and Levine

	RST.9.8-Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. RST.9.9-Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. WHST.9-10.2.a-Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. WHST.9-10.2.f-Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). WHST.9-10.4-Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.				

May

Review: Ecological Interactions

Standards	Essential Questions	Content	Skills	Resources
BIO.B.4.1-Describe ecological levels of organization in the biosphere. BIO.B.4.2-Describe interactions and relationships in an ecosystem. RST.9.1-Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. RST.9.2-Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.9.3-Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.9.4-Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9 & 10 texts and topics. RST.9.5-Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). RST.9.7-Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. WHST.9-10.1.c-Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claims) and reasons, between reasons and evidence, and between claim(s) and counterclaims. WHST.9-10.1.e-Provide a concluding statement or section that follows from or supports the argument presented. WHST.9-10.2-Write informative/explanatory texts, including the narration of historical events, scientific procedures/	• How do biotic and abiotic factors shape ecosystems? • What factors contribute to changes in populations? • How have human activities shaped local and global ecology?	• Biotic and abiotic factors in the ecosystem • Food chains, food webs, energy pyramids • Biogeochemical cycles • Biomes • Community interactions • Succession • Population Dynamics	• Describe how living organisms affect the survival of one another. • Explain the biotic and abiotic parts of an ecosystem and their interactions. • Predict how limiting factors such as physical, biological, chemical factors, etc. can affect organisms. • Use evidence to explain how patterns in populations affect natural systems. • Explain how energy moves through trophic levels in ecosystems. • Describe predator-prey relationships in ecosystems. • Investigate how limiting factors affect populations. • Compare cycles of matter with	Website: Pearson Success Net Textbook: **Biology,** Miller and Levine

	experiments, or technical processes. WHST.9-10.2.f-Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). WHST.9-10.5-Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. WHST.9-10.6-Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.			conservation of energy in ecosystems	

ASSESSMENTS

Suggested Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

- Pre-Assessments of prior knowledge (e.g. entrance cards or KWL chart)
- Labs/lab reports
- Bell ringers/Problems of the Day(PODs)
- Discussions
- Teacher observation/Questioning
- Graphic organizers (e.g. Venn diagrams, word mapping, webbing, KWL chart, etc.)
- Summarizing
- Retelling
- Notetaking
- Problem-based learning modules
- Authentic assessment
- Oral presentations
- Outlining
- Journaling
- Student presentations/projects
- Open-ended response
- Classroom Performance System (CPS)

Suggested Summative Assessments:

- Essays
- Open-Ended Responses
- Projects
- Quizzes/tests
- Student presentations
- Portfolios
- Lab Practical
- Lab Reports

District Approved Assessment Instruments

- Any district approved assessment instrument

Portfolio Assessment: _____ Yes __X__ No

District-wide Final Examination Required: _____ Yes __X__ No

Course Challenge Assessment (Describe):

WRITING TEAM: WCSD Biology Teachers

WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? __X__ Yes _____ No
2. Does this course issue a mark/grade for the report card?

   __X__ Yes _____ No
3. Does this course issue a Pass/Fail mark? _____ Yes __X__ No
4. Is the course mark/grade part of the GPA calculation?

   __X__ Yes _____ No
5. Is the course eligible for Honor Roll calculation? __X__ Yes _____ No
6. What is the academic weight of the course?

   _____ No weight/Non credit __X__ Standard weight

   _____ Enhanced weight (Describe)