BIOLOGY SCOPE AND SEQUENCE

STANDARDS	IFD
PLC HUB	OTHER

QUARTER 1 (47 DAYS)

PACING	TN STANDARDS	TEXT/RESOURCES	LEARNING TARGETS	ASSESSMENT/PROJECTS
3 Days for Chapter 1	**Bio1.LS1.1:** Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation). **Bio1.LS4.1:** Analyze and interpret scientific data that common ancestry and biological evolution are supported by multiple lines of empirical evidence (e.g. DNA sequences, amino acid sequences, anatomical structures, the fossil record, biogeography, or order of appearance of structures during embryological development). **Bio1.LS4.2:** Apply concepts of statistics (i.e. probability) to support explanations that organisms in a population with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	**Textbook Chapters:** Chapter 1 - Introduction to Biology (3 Days) Scientific Method and graphs **Quiz	1.1 THE STUDY OF LIFE • Explain life from a scientific perspective and how it is organized. • Relate DNA and inheritance to the diversity of life on Earth. • Describe how organisms can change over time. 1.2 CONSTRUCTING EXPLANATIONS ABOUT THE NATURAL WORLD • Analyze the practices of science associated with the different parts of an investigation. • Explain what a system is and how science uses systems to answer questions. • Evaluate the role of bias in data collection and reporting 1.3 USING BIOLOGY TO DEVELOP SOLUTIONS	Oreo Activity Chapter 1 Quiz

9 Days for Chapter 2	**Bio1.LS4.3:** Analyze and interpret data that natural selection is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. **Bio1.LS2.1:** Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. **Bio1.LS2.2:** Create, or use, a mathematical model to describe the transfer of energy from one trophic level to another. Explain how the inefficiency of energy transfer between trophic levels affects the relative number of organisms that can be supported at each trophic level and necessitates a constant input of energy from sunlight and inorganic compounds from the environment. **Bio1.LS2.3**: Obtain, evaluate, and communicate information based on evidence to describe how the impact of varying levels of disturbance is related to the resilience of an ecosystem.	Chapter 2 - Energy and Matter in Ecosystems (9 Days) **Quiz, Test, Lab	• Describe the practices of engineering. • Differentiate between criteria and constraints and identify how they are utilized when defining a problem. • Design possible solutions to a problem that takes into account a range of criteria and constraints. • Explain why solutions are tested, evaluated, and modified for optimization. 2.1 ECOLOGICAL SYSTEMS • Distinguish between the levels of ecological organization. • Describe how matter and energy support the survival of organisms 2.2 MODELING THE TRANSFER OF ENERGY AND MATTER • Define the main ecological roles in an ecosystem and identify their functions. • Identify the trophic levels of a simple ecosystem. • Predict potential impacts on an ecosystem resulting from food-chain disruptions. 2.3 MODELING ENERGY AND MATTER DISTRIBUTION • Model the distribution of energy in a community using an energy pyramid.	Chapter 2 Quiz Properties of Water Lab Chapter 2 Test

8 Days for Chapter 3 *8 Days for Chapter 4*	**Bio1.LS2.1:** Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. **Bio1.LS2.3**: Obtain, evaluate, and communicate information based on evidence to describe how the impact of varying levels of disturbance is related to the resilience of an ecosystem **Bio1.LS4.3**: Analyze and interpret data that natural selection is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	Chapter 3 - Ecosystems (8 Days) **Quiz, Test, Lab	• Model the distribution of biomass in a community using a biomass pyramid. • Model the distribution of individuals in a community using a pyramid of numbers. 2.4 CYCLING OF MATTER • Define the Earth system and its boundaries, and describe it in terms of interconnected subsystems. • Model the hydrologic (water) cycle, carbon cycle, nitrogen cycle, and phosphorus cycle 3.1 ECOLOGICAL RELATIONSHIPS • Distinguish between a habitat and a niche. • Classify the roles and relationships that exist within an ecosystem 3.2 BIODIVERSITY • Explain the three levels at which biodiversity is measured. • Distinguish between species richness and species evenness. • Identify the criteria for designation as a biodiversity hotspot. • Explain how keystone species differ from other species in a community 3.3 ECOSYSTEM STABILITY AND CHANGE	Chapter 3 Quiz Chapter 3 Test

13 Days for Chapter 5	**Bio1.LS4.4:** Construct an explanation based on evidence for how natural selection leads to adaptation in populations. **Bio1.LS2.1:** Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. **Bio1.LS2.3**: Obtain, evaluate, and communicate information based on evidence to describe how the impact of varying levels of disturbance is related to the resilience of an ecosystem	Chapter 4 - Ecosystems (8 Days) **Quiz, Test, Lab	• Recognize natural and human-caused ecological disturbances. • Relate the effects of natural disturbance on ecosystems. • Compare primary and secondary succession 4.1 MEASURING POPULATIONS • Identify methods used by scientists to measure populations. • Describe how mathematical representations can be used to estimate populations without having to count each individual organism. 4. 2 MODELING POPULATION GROWTH PATTERNS • Calculate growth rates given data. • Explain how immigration and emigration affect population growth patterns. • Use mathematical and computational models to describe how populations grow in an environment. • Analyze survivorship curves to identify life history patterns of organisms 4. 3 FACTORS THAT LIMIT POPULATION GROWTH • Explain how limiting factors constrain the carrying capacity of an environment. • Explain how density-dependent factors	Chapter 4 Quiz Chapter 4 Test Chapter 5 Quiz

	Bio1.LS1.3: Use a model to describe how differentiation in a multicellular organism creates specialized cells that perform diverse functions to work together to meet the needs of the entire organism, including human development	Chapter 5 - Populations (13 Days) **Quiz, Test, Lab	can slow population growth rates. • Understand how density-independent factors differ from density-dependent factors and how they affect populations 5.1 ELEMENTS AND COMPOUNDS • Distinguish the parts of an atom and their properties. • Explain different kinds of bonds between atoms. • Characterize different kinds of attractions that can exist between molecules. 5. 2 WATER • Describe the unique properties of water that make life on Earth possible. • Explain the differences between acids and bases and how pH is used to measure substances 5. 3 CARBON-BASED MOLECULES • Relate monomers, polymers, and hydrocarbons. • Describe the structure of carbohydrates and their functions in organisms. • Describe the structure of lipids and their functions in organisms. • Explain the relationship between nucleotides and nucleic acids. • Explain the relationship between amino	Chapter 5 Quiz Smarties Lab Quarter 1 Test

			acids and proteins.	

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STANDARDS	IFD
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QUARTER 2 (45 DAYS)

PACING	TN STANDARDS	TEXT/RESOURCES	LEARNING TARGETS	ASSESSMENT/PROJECTS
10 Days for Chapter 6A *11 Days for Chapter 6B*	**Bio1.LS1.1:** Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation). **Bio1.LS1.3:** Use a model to describe how differentiation in a multicellular organism creates specialized cells that perform diverse functions to work together to meet the needs of the entire organism, including human development	**Textbook Chapters:** Chapter 6 A - Cell Structure and Function ● Cell Structures and Cell Membranes (10 Days) **Quiz, Test, Lab Chapter 6 B ● Photosynthesis and Cellular Respiration (11 days) **Quiz, Test, Lab	6.1 CELL STRUCTURES • Identify components of all cells. • Describe the structure and function of components in prokaryotic cells. • Describe the structure and function of components in eukaryotic cells. • Explain the Endosymbiont theory 6.2 CELL MEMBRANES • Describe the structure of the cell membrane and how proteins function within it. • Explain homeostasis and the involvement of the cell membrane in its maintenance. • Summarize the different modes of transport across the cellular membrane. 6. 3 PHOTOSYNTHESIS AND	Microscope Lab Gummy Bear Lab Chapter 6A Quiz Chapter 6A Test Chapter 6B Quiz Chapter 6B Test

			CELLULAR RESPIRATION • Explain the importance of energy usage by cells. • Describe the processes involved in cellular respiration and ATP Synthesis. • Summarize the stages of photosynthesis and the light-dependent and light-independent reactions. • Identify other energy conversion pathways available to cells.	
	Bio1.LS1.1: Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation). **Bio1.LS1.2:** Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. **Bio1.LS3.1:** Engage in an argument from evidence that the process of cellular division (mitosis) creates diploid daughter	Chapter 7 - Cell Growth (10 Days) **Quiz, Test, Lab	7.1 CELL CYCLES • Compare and contrast the prokaryotic and eukaryotic cell cycle. • Explain the importance of eukaryotic cell cycle regulation 7.2 MITOSIS • Describe chromosomes and the structure of DNA. • Sequence the stages of mitosis and cytokinesis 7.3 CELL DIFFERENTIATION • Explain how cell differentiation results in different morphological structures in multicellular organisms.	Chapter 7 Quiz Chapter 7 Test Muscle Fatigue Lab Bioman Cellular Respiration Simulation Benchmark Semester Exam

	cells that are genetically identical to the diploid parent cells.		• Discuss the role of pluripotent stem cells in cell differentiation. • Apply the concept of cell differentiation to three types of tissues in plants. Conversion pathways available to cells	

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STANDARDS	IFD
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QUARTER 3 (50 DAYS)

PACING	TN STANDARDS	TEXT/RESOURCES	LEARNING TARGETS	ASSESSMENT/PROJECTS
10 Days far Chapter 11	**Bio1.LS1.1:** Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation). **Bio1.LS3.1**: Engage in an argument from evidence that the process of cellular division (mitosis) creates diploid daughter cells that are genetically identical to the diploid parent cells.	**Textbook Chapters:** Chapter 11 - DNA, RNA, and Proteins (10 Days) **Quiz and Test	11.1 GENETIC INFORMATION • Discuss how experimentation led to the discovery of the structure and function of DNA. • Relate the structures of DNA, mRNA, and proteins to their functions in an organism. • Analyze a model of gene expression to describe the transfer and translation of genetic information 11.2 REPLICATION, TRANSCRIPTION, AND TRANSLATION • Relate the structure of DNA to its	Bioman Mitosis Simulation Chapter 11 Test Monster Lab Bioman Meiosis Simulation Chapter 12 Test Chapter 13 Quiz Bioman DNA Simulation Chapter 14 Quiz Chapter 13/14 Test

18 Days far Chapter 12	**Bio1.LS3.1**: Engage in an argument from evidence that the process of cellular division (mitosis) creates diploid daughter cells that are genetically identical to the diploid parent cells. **Bio1.LS3.2**: Engage in an argument from evidence that the process of meiosis exists to create genetic variation in a population from the creation of new combinations of genetic material in each of the haploid gametes.	Chapter 12 - Genetic Variation and Heredity (18 Days) **Quiz and Test	replication. • Describe the process and outcomes of transcription. • Explain the process of translation using codons 11.3 REGULATING GENE EXPRESSION • Compare gene expression in prokaryotes and eukaryotes. • Explain the function of introns and exons. • Describe environmental factors that can affect gene expression 12.1 MEIOSIS • Describe the relationship between the genes, alleles, and traits. • Compare the advantages and disadvantages of asexual and sexual reproduction. • Explain how sexual reproduction results in greater genetic diversity among offspring 12.2 MUTATIONS • Explain how mutations can affect trait expression. • Describe the characteristics of genetic and chromosomal mutations.	Chapter 15 Quiz Benchmark *Assortment of Worksheets

6 Days far Chapter 14/15	**Bio1.LS4.1**: Analyze and interpret scientific data that common ancestry and biological evolution are supported by multiple lines of empirical evidence (e.g. DNA sequences, amino acid sequences, anatomical structures, the fossil record, biogeography, or order of appearance of structures during embryological development).	Chapter 14/15 - Evidence for and Theory of Evolution (6 Days) **Lab and Test	• Relate genetic mutations to greater genetic diversity within a population 12.3 MENDELIAN INHERITANCE • Differentiate between genotype and phenotype. • Evaluate possible genotypes from a genetic cross. • Outline how a recessive allele is expressed 12.4 OTHER PATTERNS OF INHERITANCE • Compare the difference between Mendelian inheritance, incomplete dominance, and codominance. • Relate how environmental factors affect phenotype. • Describe how sex-linked traits are expressed in male and female offspring 14.1 LINES OF EVIDENCE • Explain how evolution occurs at large and small scales. • Differentiate the five lines of evidence that support evolution. • Apply cladistics to explain evolutionary relationships 14.2 FOSSIL AND GEOLOGICAL EVIDENCE	

			• Sequence steps in the process of fossilization. • Explain different methods used to date fossils. • Differentiate three different types of evidence used to determine evolutionary relationships and the history of life on Earth 14.3 DEVELOPMENTAL , ANATOMICAL , AND GENETIC EVIDENCE • Explain how developmental evidence shows evolutionary relationships. • Identify anatomical evidence for evolution and distinguish among homologous, analogous, and vestigial structures. • Summarize how advancements in genetic evidence build knowledge about evolution	
	Bio1.LS4.2: Apply concepts of statistics (i.e. probability) to support explanations that organisms in a population with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. **Bio1.LS4.3**: Analyze and interpret data that natural selection is influenced by (1) the potential for a species to		15.1 DEVELOPING THE THEORY OF EVOLUTION • Compare the differences and similarities between artificial and natural selection. • Communicate evidence that supports the theory of evolution.	

	increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. . . **Bio1.LS3.2**: Engage in an argument from evidence that the process of meiosis exists to create genetic variation in a population from the creation of new combinations of genetic material in each of the haploid gametes. . **Bio1.LS4.1**: Analyze and interpret scientific data that common ancestry and biological evolution are supported by multiple lines of empirical evidence (e.g. DNA sequences, amino acid sequences, anatomical structures, the fossil record, biogeography, or order of appearance of structures during embryological development).		• Evaluate the evidence for natural selection as a mechanism for evolution 15.2 EVOLUTION IN POPULATIONS • Describe how populations evolve due to environmental factors. • Construct an explanation as to how the process of natural selection leads to adaptations. • Relate change in distribution of traits in a population to type of natural selection 15.3 OTHER MECHANISMS OF EVOLUTION • Describe evolution mechanisms that can influence allele frequency. • Analyze how mechanisms of evolution affect genetic diversity in both small and large populations	
7 Days far Chapter 16	**Bio1.LS4.3**: Analyze and interpret data that natural selection is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction,	Chapter 16 - Survival in Changing Environments (7 Days) **Test and Lab	16.1 SPECIATION • Describe the mechanisms of speciation. • Explain how adaptive radiation can change a lineage.	

	(3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment **Bio1.LS4.4**: Construct an explanation based on evidence for how natural selection leads to adaptation in populations.		• Differentiate the possible patterns in evolution that can exist between species 16.2 EXTINCTION • Identify the different kinds of extinction that lead to the elimination of species. • Evaluate the protections provided to endangered and threatened species. • Differentiate the causes of species decline 16. 3 HUMAN IMPACT ON THE ENVIRONMENT • Explain how human population growth impacts resource use. • Describe the effects of water pollution and air pollution caused by human activities. • Analyze how human activities lead to land degradation and habitat loss 16.4 REDUCING HUMAN IMPACT ON THE ENVIRONMENT • Describe how sustainability can help with the management of limited resources. • Analyze how air and water pollution can be decreased. • Evaluate design solutions to manage ecosystem degradation and habitat loss.	

			• Explain why biodiversity should be maintained	

BIOLOGY SCOPE AND SEQUENCE

STANDARDS	IFD
PLC HUB	OTHER

QUARTER 4 (48 DAYS)

PACING	TN STANDARDS	TEXT/RESOURCES	LEARNING TARGETS	ASSESSMENT/PROJECTS
3 Days far Chapter 8	**Bio1.LS1.1:** Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation). **Bio1.LS2.3:** Obtain, evaluate, and communicate information based on evidence to describe how the impact 66	**Textbook Chapters:** Chapter 8 - Diversity of Living (3 Days)	8.1 BACTERIA AND ARCHAEA • Relate the metabolism of an organism to the environments in which it might be able to live. • Compare and contrast the structural differences between archaea and bacteria. • Examine ways that bacterial pathogens are transmitted and cause infection in new hosts 8.2 PROTISTS • Evaluate how the structures of some protists are related to how they function in their environment. • Explain why protists are described as a kingdom. • Identify characteristics common to	Gel Electrophoresis Lab (After EOC) Chapter 8 Test EOC Group Project Semester Exam *Assortment of Worksheets and Labs time pending

			protists 8.3 FUNGI • Describe the structures that help fungi to produce and disperse spores. • Explain the symbiotic relationship between fungi and plants. • Identify characteristics that are common to all fungi 8.4 VIRUSES • Characterize the four major groups of viral genomes and where they replicate. • Compare and contrast bacteriophage and HIV replication. • Identify the characteristics that are common to all viruses	
3 Days far Chapter 9	**Bio1.LS1.1:** Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation). **Bio1.LS1.2:** Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. **Bio1.LS2.3:** Obtain, evaluate, and communicate information based on evidence to describe how the impact of varying	Chapter 9 - Plant Systems (3 Days)	9.1 PLANT ORIGINS AND DIVERSITY • Illustrate some of the adaptations plants need to survive on land. • Differentiate the characteristics of the four major plant groups. • Indicate the relationship between structure and function of plant organs 9.2 TRANSPORT IN PLANTS • Relate the structures involved in plant transport to their functions. • Describe the process and mechanics of both fluid and nutrient transport.	

	levels of disturbance is related to the resilience of an ecosystem.		• Construct an explanation of how plants control the conservation and release of water. 9.3 PLANT REPRODUCTION • Sequence the steps in the life cycle of a gymnosperm and an angiosperm. • Diagram the relationship between the structure of flowering plant parts and their function in reproduction. • Compare the different methods of asexual reproduction 9.4 PLANT RESPONSES TO THE ENVIRONMENT • Summarize the four main types of plant hormones that regulate specific plant behaviors. • Describe different environmental stimuli and the type of responses they trigger. • Assess plant responses specific to daily and seasonal changes in a plant's environment	
3 Days far Chapter 10	**Bio1.LS1.1:** Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation).	Chapter 10 - Animal Systems (3 Days)	10.1 ANIMAL DIVERSITY • Summarize the shared characteristics in animals. • Compare the similarities and differences of the structures present within the major animal groups.	

	Bio1.LS4.1: Analyze and interpret scientific data that common ancestry and biological evolution are supported by multiple lines of empirical evidence (e.g. DNA sequences, amino acid sequences, anatomical structures, the fossil record, biogeography, or order of appearance of structures during embryological development). **Bio1.LS2.4:** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. **Bio1.LS4.2:** Apply concepts of statistics (i.e. probability) to support explanations that organisms in a population with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.		• Interpret the differences between fossils found from the Precambrian era and the Cambrian period 10.2 DEFINING ANIMAL SYSTEMS • Describe the levels of organization found in vertebrates. • Model the interactions between the four major organ systems of vertebrates: skeletal, muscular, nervous, and cardiovascular. • Summarize how the organ systems function together to support nutrient absorption and immunity and defense against pathogens 10.3 MAINTAINING HOMEOSTASIS • Give examples of how homeostasis is maintained in an organism. • Describe how negative feedback mechanisms are involved in homeostasis. • Compare the difference between negative and positive feedback mechanisms 10.4 ANIMAL BEHAVIOR • Differentiate between instinctive behaviors and behaviors that are learned. • Construct an explanation of the different ways that animals communicate with other members of their species and other species.	

14 Days far Chapter 13		EOC Testing Chapter 13 - Genetic Technology	• Summarize how parenting behavior affects offspring survival. • Distinguish how group living and social behavior can increase individual survival 13.1 TOOLS IN GENETIC TECHNOLOGY • Describe some of the tools scientists use to work with DNA. • Relate genomics and the tools used for genome analysis 13.2 GENETIC ENGINEERING • Identify how genetic engineering is used to modify different kinds of organisms. • Describe how somatic cells are used to develop new organisms. • Explain how gene therapy might be used to correct a genetic disorder. • Evaluate if CRISPR technology is a more effective process for gene therapy 13.3 VACCINE DEVELOPMENT • Summarize how the immune system protects individuals from infection. • Describe how vaccines are used to protect the population from infectious diseases.	

			• Compare the differences between the types of vaccine technologies that have been developed and implemented. • Evaluate the other measures that can be used to support vaccines	