



****Biology****

Timeline	Unit/theme	Standard	Student Focused Objective	Resources/ Suggested Activities
Days: 10 August (1st - 14t)	Unit 1 Building Blocks: Organic Molecules	SC15.BIO.1 Use models to compare and contrast how the structural characteristics of carbohydrates, nucleic acids, proteins, and lipids define their function in organisms.	Learning Targets: <ul style="list-style-type: none"> • I can use models to compare and contrast the four key organic macromolecules • I can identify the monomers and polymers of carbohydrates, nucleic acids, proteins, and lipids. • I can describe how atoms are used to build macromolecules. • I can discuss how the structure of a macromolecule defines its function. 	Lab: Macromolecules Murder Mystery Videos: Amoeba Sisters: Biomolecules Notes/Presentations: Chemistry of Life PPT Chemistry of Life Notes
Days: 7 August (15th - 23rd)	Unit 1 Building Blocks: Organic Molecules	SC15.BIO.3 Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins. SC15.BIO.3a Obtain and evaluate experiments of major scientists and communicate their contributions to the development of the	Learning Targets: <ul style="list-style-type: none"> • I can create an accurate model of DNA using my understanding of its structure and function. • I can use evidence from major scientists to explain the structure and organization of DNA. • I can evaluate the contributions of major scientists in the discovery of DNA's structure. • I can use models to describe what the central dogma is and how proteins are synthesized. 	Project: Students will work in small groups and individually to create a 3-D model of DNA's structure using materials provided in class. Videos: Rosalind Franklin: DNA's unsung hero From DNA to protein- 3D Notes/Presentations: DNA and Protein Synthesis PPT

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		structure of DNA and to the development of the central dogma of molecular biology.		DNA and Protein Synthesis Notes
Days: 5 (August 26th - 30th)	Unit 1 Building Blocks: Organic Molecules	SC15.BIO.3 Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins. SC15.BIO.3c Obtain information to identify errors that occur during DNA replication (e.g., deletion, insertion, translocation, substitution, inversion, frame-shift, point mutations).	Learning Targets: <ul style="list-style-type: none"> I can explain how errors occur in DNA replication and evaluate the implications of these errors. I can use models to represent the outcomes of different types of DNA replication errors. I can describe how the functionality of proteins is affected when errors are made in the DNA. I can create evidence based explanations to discuss how protein is synthesized and how errors in DNA result in changes in proteins. 	Activity: Gene Mutation Worksheets DNA Transcription and Translation Worksheets Gene Expression PhET Simulation Videos: What happens when your DNA is damaged? Notes/Presentations: DNA and Protein Synthesis PPT DNA and Protein Synthesis Notes
Days: 5 (Sept. 9th - 13th)	Unit 1 Building Blocks: Organic Molecules	SC15.BIO.3 Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins.	Learning Targets: <ul style="list-style-type: none"> I can conduct research on modern day biotechnology. I can use research findings to discuss the practical and ethical implications of advancements in genetic technology. I can evaluate the efficacy of the Human Genome Project. 	Videos: The race to sequence the human genome Notes/Presentations: Biotechnology PPT Biotechnology Notes

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		<p>SC15.BIO.3b Obtain, evaluate, and communicate information that explains how advancements in genetic technology (e.g., Human Genome Project, Encyclopedia of DNA Elements [ENCODE] project, 1000 Genomes Project) have contributed to the understanding as to how a genetic change at the DNA level may affect proteins and, in turn, influence the appearance of traits.</p>		
<p>Days: 9 (Sept. 16th - 26th)</p>	<p>Unit 2 Cells and their functions</p>	<p>SC15.BIO.2 Obtain, evaluate, and communicate information to describe the function and diversity of organelles and structures in various types of cells (e.g., muscle cells having a large amount of mitochondria, plasmids in bacteria, chloroplasts in plant cells).</p>	<p>Learning Targets:</p> <ul style="list-style-type: none"> • I can describe the function of organelles. • I can use my knowledge of organelles to evaluate how their function contributes to specialized cells. • I can explain the difference between eukaryotic cells and prokaryotic cells. • I can discuss the Cell Theory and the major scientist who contributed to its discovery. 	<p>Project: Students will create a 3-D model of a eukaryotic cell of their choice using materials provided in class.</p> <p>Videos: Introduction to Cells: The Grand Cell Tour</p> <p>Notes/Presentations: Introduction to Cells PPT Intro to Cells Notes</p>

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<p>Days: 5 (Sept. 30th - Oct. 4th)</p>	<p>Unit 2 Cells and their functions</p>	<p>SC15.BIO.5 Plan and carry out investigations to explain feedback mechanisms (e.g., sweating and shivering) and cellular processes (e.g., active and passive transport) that maintain homeostasis.</p> <p>SC15.BIO.5a Plan and carry out investigations to explain how the unique properties of water (e.g., polarity, cohesion, adhesion) are vital to maintaining homeostasis in organisms.</p>	<p>Learning Targets:</p> <ul style="list-style-type: none"> • I can compare and contrast positive and negative feedback loops. • I can evaluate and explain how feedback loops are used to maintain homeostasis. • I can conduct investigations to explore the properties of water. • I can explain how active and passive transport operate in the cell. 	<p>Labs: Egg Osmosis Lab</p> <p>Videos: Homeostasis and Negative/Positive Feedback</p> <p>Notes/Presentations: Introduction to Cells PPT Intro to Cells Notes</p>
<p>Days: 10 (Oct. 7th-21st)</p>	<p>Unit 2 Cells and their functions</p>	<p>SC15.BIO.6 Analyze and interpret data from investigations to explain the role of products and reactants of photosynthesis and cellular respiration in the cycling of matter and the flow of energy.</p> <p>SC15.BIO.6a Plan and</p>	<p>Learning Targets:</p> <ul style="list-style-type: none"> • I can compare and contrast photosynthesis and cellular respiration. • I can explain the chemical reaction of photosynthesis. • I can explain the chemical of cellular respiration. • I can use models to demonstrate how energy flows through the processes of photosynthesis and cellular respiration. 	<p>Videos: Photosynthesis and Cellular Respiration</p> <p>Notes/Presentation: Cellular Energy PPT Cellular Energy Notes</p>

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		carry out investigations to explain the interactions among pigments, absorption of light, and reflection of light.		
Days: 9 (Oct. 22nd - Nov. 1st)	Unit 2 Cells and their functions	SC15.BIO.4 Develop and use models to explain the role of the cell cycle during growth and maintenance in multicellular organisms (e.g., normal growth and/or uncontrolled growth resulting in tumors).	Learning Targets: <ul style="list-style-type: none"> • I can explain the cell cycle and describe each of its phases. • I can develop models to demonstrate how cells can grow abnormally. • I can compare and contrast the phases of mitosis and meiosis. • I can evaluate the products of mitosis. • I can explain how uncontrolled cell growth can result in the creation of tumors. 	Book: <i>The Immortal Life of Henrietta Lacks</i> by Rebecca Skloot (excerpts will be selected from the book to discuss Henrietta Lacks' contribution of modern day understanding of cancer cells) Videos: The immortal cells of Henrietta Lacks Extra Materials: Cell Growth and Division PPT Cell Growth and Division Notes
Days: 14 (Nov. 4th - 22nd)	Unit 3 Heredity	SC15.BIO.11 Analyze and interpret data collected from probability calculations to explain the variation of expressed	Learning Targets: <ul style="list-style-type: none"> • I can collect and interpret data using Punnett Squares. • I can explain how genes are independently assorted and discuss its importance. 	Lab: Bumble Bee Lab Worksheet Bumble Bee Lab Presentation Bumble Bee Additional

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		<p>traits within a population.</p> <p>SC15.BIO.11a Use mathematics and computation to predict phenotypic and genotypic ratios and percentages by constructing Punnett squares, including using both homozygous and heterozygous allele pairs.</p> <p>SC15.BIO.11b Develop and use models to demonstrate codominance, incomplete dominance, and Mendel's laws of segregation and independent assortment.</p> <p>SC15.BIO.11c Analyze and interpret data (e.g., pedigree charts, family and population studies) regarding Mendelian and complex genetic disorders (e.g., sickle-cell anemia, cystic fibrosis, type 2 diabetes) to determine patterns of genetic inheritance and disease risks from both</p>	<ul style="list-style-type: none"> • I can describe the relationship between phenotypes and genotypes. • I can create pedigree charts to show how traits and disorders are passed between generations. • I can use mathematics to create phenotypic and genotypic ratios and percentages. • I can use models to evaluate different types of dominance i.e. codominance, incomplete dominance, and complete dominance. • I can research and discuss different types of genetic disorders and their significance. 	<p>Materials</p> <p>Videos: How Mendel's pea plants helped us understand genetics</p> <p>Inherited Genetic Disorders</p> <p>Notes/Presentations: Intro to Genetics PPT Intro to Genetics Notes</p>
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		genetic and environmental factors.		
Days: 14 (Dec. 2nd - 19th)	Unit 3 Heredity	<p>SC15.BIO.12 Develop and use a model to analyze the structure of chromosomes and how new genetic combinations occur through the process of meiosis.</p> <p>SC15.BIO.12a Analyze data to draw conclusions about genetic disorders caused by errors in meiosis (e.g., Down syndrome, Turner syndrome).</p>	<p>Learning Targets:</p> <ul style="list-style-type: none"> • I can use models to analyze the structure of Chromosomes. • I can describe how genetic combinations occur during meiosis. • I can evaluate the implications of genetic errors that occur during meiosis. • I can interpret data regarding the inheritance and prevalence of genetic disorders. 	<p>Project: Students will work in groups or individually to create a presentation over the genetic disorder of their choosing.</p> <p>Notes/Presentations: Intro to Genetics PPT Intro to Genetics Notes</p>
7 Flex Days	Units 1-3	Standards: 1, 2, 3, 4, 5, 6, 11, and 12	Flex days will consist of initial introductions, lab safety, reviews, and exams.	