

Wyoming Department of Education Required Virtual Education Course Syllabus

Niobrara County School District # 1

Program Name	Wyoming Virtual Academy	Content Area	SC
Course ID	D-SCI-204AV2-K	Grade Level	9-12
Course Name	Summit Honors Biology - Semester 1	# of Credits	0.5
SCED Code	03051H0.5012	Curriculum Type	K12 Inc

COURSE DESCRIPTION

In this course, students focus on the chemistry of living things: the cell, genetics, evolution, the structure and function of living things, and ecology. The program consists of online lessons including extensive animations, an associated reference book, collaborative activities, virtual laboratories, and hands-on laboratory experiments students can conduct at home.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
HS-LS1-1	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms.
HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
HS-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
HS-LS1-5	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
HS-LS1-6	Construct explanations and revise, as needed, based on evidence for: 1) how carbon, hydrogen, and oxygen may combine with other elements to form amino acids and/ or other large carbon-based molecules, and 2) how other hydrocarbons may also combine to form large carbon-based molecules.
HS-LS1-7	Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of sugar molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
HS-LS3-1	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
HS-LS3-2	Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
HS-LS3-3	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population
HS-PS1-2	Construct an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties, and revise, as needed.
HS-PS1-3	Plan and conduct an investigation to gather evidence to compare the structure of substances at the macroscopic scale to infer the strength of electrical forces between particles.

HS-PS1-7	Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	
HS-ETS1-5	Evaluate the validity and reliability of claims in a variety of materials.	
SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1: The Science of Biology Lesson 1: Semester 1 Introduction		Complete the Semester Introduction. Complete the Semester Introduction student activity.
Unit 1: The Science of Biology Lesson 2: Biology and Scientific Methods		List and explain the steps in a scientific method. List and explain the steps in scientific methods. Describe how scientific methods developed over time.
Unit 1: The Science of Biology Lesson 3: Scientific Processes 1		Describe the importance of developing a question and forming a hypothesis in a scientific method. Understand how to design an experiment that tests a hypothesis. Explain the elements of a well-designed experiment and discuss the importance of controlling extraneous variables.
Unit 1: The Science of Biology Lesson 4: Scientific Processes 2		Understand the difference between qualitative data and quantitative data. Describe how taking data and analyzing it are important steps in the experimental scientific method. Describe how forming conclusions and communicating are important for doing science. Understand that sometimes new hypotheses or new experiments need to be made.

<p>Unit 1: The Science of Biology Lesson 5: Laboratory: Using a Microscope</p>		<p>Identify the parts of a microscope and describe their functions.</p> <p>Demonstrate safe use of a microscope.</p> <p>Observe prepared slides and living organisms under a microscope.</p>
<p>Unit 1: The Science of Biology Lesson 6: The Characteristics of Life 1</p>		<p>Explain how living things meet the challenges of getting and using energy, growing, reproducing, and maintaining structure.</p> <p>Explain the characteristics of life as indicated by cellular processes, including homeostasis.</p> <p>Understand the characteristics of life as indicated by cellular processes, including homeostasis.</p> <p>Understand why it is important for living things to obtain and use energy, grow, reproduce, and maintain structure.</p> <p>Understand that homeostasis is the maintenance of an organism's internal environment within certain limits.</p> <p>Explain the concept of homeostasis and describe why it is considered one of life's chief characteristics.</p>
<p>Unit 1: The Science of Biology Lesson 7: The Characteristics of Life 2</p>		<p>Understand what it means for a living organism to be organized.</p> <p>Recognize the levels of organization in multicell organisms.</p> <p>Understand the concept of biological organization.</p> <p>Understand how structure relates to function in living organisms.</p>
<p>Unit 1: The Science of Biology Lesson 8: The Characteristics of Life 3</p>		<p>Recognize that evolutionary adaptations help an organism survive and reproduce.</p> <p>Understand that organisms sense, interact with, and respond to their environment.</p>

		<p>Understand that the principles of biological organization apply to populations, communities, ecosystems, and biomes.</p>
<p>Unit 1: The Science of Biology Lesson 9: Energy and Life</p>		<p>Explain how organisms use the continuous input of energy and matter to maintain their chemical and physical organization.</p> <p>Understand that all living things need energy.</p> <p>Explain the role of the sun in meeting the energy needs of living things.</p> <p>Describe the flow of energy from one living thing to another.</p> <p>Understand that living things use energy in a chemical form.</p>
<p>Unit 1: The Science of Biology Lesson 10: Structure and Function</p>		<p>Use examples to explain the relationship of structure and function in organisms.</p> <p>Recognize how the structure of an organism's parts relates to their function.</p> <p>Explain the role of adaptations in the relationship between structure and function.</p> <p>Identify various examples of the relationship between structure and function.</p>
<p>Unit 1: The Science of Biology Lesson 11: Unit 1 Test</p>	<p>HS-LS1-5 HS-PS1-7</p>	
<p>Unit 2: The Chemistry of Life Lesson 1: Chemistry Review</p>		<p>Relate the importance of knowing chemistry to an understanding of the processes of life.</p> <p>Describe the parts of an atom.</p> <p>Explain the differences between different atoms.</p> <p>Explain what an element is and</p>

		describe how and where elements occur on earth.
Unit 2: The Chemistry of Life Lesson 2: Chemical Bonds		Draw the formation of an ionic bond between atoms. Draw the formation of a covalent bond between atoms. Draw the formation of a hydrogen bond between atoms. Explain how matter tends toward disorganized states.
Unit 2: The Chemistry of Life Lesson 3: Carbon and Life		Describe the importance of carbon and carbon compounds to living things. Describe the role of carbohydrates, proteins, lipids, nucleic acids, and water to living things. Recognize that organic compounds contain carbon and that carbon atoms are the building blocks of molecules essential for life. Recognize that carbon's ability to combine with other atoms makes it unique.
Unit 2: The Chemistry of Life Lesson 4: Organic Compounds with Trace Elements		Explain that living cells are composed of a small number of key chemical elements. Understand the characteristics of organic compounds. Recognize that trace elements are found within some organic compounds.
Unit 2: The Chemistry of Life Lesson 5: Ions in Living Things		Recognize that ions are present in living things. Understand that ions play important roles in living things. Recognize some key ions common to most living things.

<p>Unit 2: The Chemistry of Life Lesson 6: Useful Chemicals from Living Things</p>		<p>Understand that some chemical compounds in living things can benefit human health.</p> <p>Recognize various examples of natural compounds being used for human health.</p> <p>Understand that the loss of species is a potential loss for human health benefits.</p>
<p>Unit 2: The Chemistry of Life Lesson 7: Water</p>		<p>Describe the importance of water to living things.</p> <p>Describe the chemical nature of water.</p> <p>Describe why water is called the universal solvent and relate that to chemical reactions in a cell.</p> <p>Describe how living things use the essential molecules in a water solution to meet challenges of getting and using energy, growing, reproducing, and maintaining their structure.</p>
<p>Unit 2: The Chemistry of Life Lesson 8: Laboratory: Identifying Biological Compounds 1</p>		<p>Understand that various tests can be used to detect the presence of certain macromolecules.</p> <p>Experiment with various chemical indicators to identify the presence or absence of macromolecules.</p> <p>Gather and analyze data.</p>
<p>Unit 2: The Chemistry of Life Lesson 9: Laboratory: Identifying Biological Compounds 2</p>		<p>Understand that various tests can be used to detect the presence of certain macromolecules.</p> <p>Experiment with various chemical indicators to identify the presence or absence of macromolecules.</p> <p>Gather and analyze data.</p>
<p>Unit 2: The Chemistry of Life Lesson 10: Your Choice</p>		
<p>Unit 2: The Chemistry of Life Lesson 11: Mid-Unit Test</p>	<p>HS-LS1-6 HS-LS1-7, HS-PS1-2 HS-PS1-3</p>	

<p>Unit 2: The Chemistry of Life Lesson 12: Simple Carbohydrates</p>		<p>Recognize that carbohydrates contain carbon, hydrogen, and oxygen.</p> <p>Explain why carbohydrates function so well as chemical energy: They are easily broken down into compounds that result in the formation of usable energy.</p> <p>Recognize that simple carbohydrates are made of one or two sugar molecules.</p>
<p>Unit 2: The Chemistry of Life Lesson 13: Complex Carbohydrates</p>		<p>Understand the roles of different complex carbohydrates in living organisms.</p> <p>Recognize the different types of complex carbohydrates.</p> <p>Understand that complex carbohydrates are made of many simple carbohydrates linked together.</p> <p>Understand how complex carbohydrates can be used as energy storage.</p>
<p>Unit 2: The Chemistry of Life Lesson 14: Lipids</p>		<p>Recognize the different types of lipids: fats, oils, phospholipids, steroids, and waxes.</p> <p>Understand the role that lipids play in living organisms, such as energy storage, chemical messenger, and membrane structure.</p> <p>Understand how phospholipids form a boundary between the inside and the outside of a cell.</p>
<p>Unit 2: The Chemistry of Life Lesson 15: Amino Acids and Proteins</p>		<p>Understand the structure of amino acids and proteins.</p> <p>Recognize that a polypeptide is a chain of amino acids.</p> <p>Recognize the importance of amino acids and proteins to living things.</p>

		<p>Understand what makes up amino acids and proteins.</p>
<p>Unit 2: The Chemistry of Life Lesson 16: Levels of Protein Structure</p>		<p>Describe the primary, secondary, tertiary, and quaternary structures of a protein.</p> <p>Recognize how each level of a protein's structure influences its activity.</p> <p>Relate structure to function using examples.</p> <p>Recognize how the R-groups of amino acids affect protein structure.</p>
<p>Unit 2: The Chemistry of Life Lesson 17: Proteins as Enzymes</p>		<p>Understand the structure of amino acids and proteins.</p> <p>Understand what makes up amino acids and proteins.</p> <p>Understand that enzymes are proteins that speed up chemical reactions without being changed themselves.</p> <p>Understand how the environment may affect enzyme activity.</p> <p>Understand how enzymes lower the activation energy of a chemical reaction.</p>
<p>Unit 2: The Chemistry of Life Lesson 18: Nucleic Acids</p>		<p>Recognize that nucleic acids are macromolecules with information on how to build and maintain an organism.</p> <p>Understand the roles that DNA and RNA play in the body.</p> <p>Understand the structural similarities and differences between DNA and RNA.</p>

<p>Unit 2: The Chemistry of Life Lesson 19: ATP</p>		<p>Understand that the energy stored in ATP bonds is the most common source of energy for life processes.</p> <p>Recognize how ATP stores and releases energy.</p> <p>Understand how the structure of ATP contributes to its function in storing and providing energy.</p> <p>Recognize some of the cellular processes that require ATP.</p>
<p>Unit 2: The Chemistry of Life Lesson 20: Your Choice</p>		
<p>Unit 2: The Chemistry of Life Lesson 21: Unit Test</p>	<p>HS-LS1-1 HS-LS1-6 HS-LS1-7</p>	
<p>Unit 3: Cell Biology Lesson 1: The Cell and Life</p>		<p>Understand that the cell is the basic unit of life. Some organisms are unicellular. Organisms that are multicellular generally have cells that perform specialized functions.</p> <p>Explain that cells are the basic unit of structure and function of all living things.</p> <p>Compare and contrast organisms that are unicellular and multicellular.</p> <p>Describe how, in multicell organisms, cells are arranged into tissues, tissues into organs, and organs into systems with major functions.</p>
<p>Unit 3: Cell Biology Lesson 2: Cell Structure</p>		<p>Explain how cells were discovered and how the cell theory was developed.</p> <p>Draw a diagram of a cell and name each of its parts.</p> <p>Explain how most of the metabolic activity in a cell occurs in the cytoplasm.</p>
<p>Unit 3: Cell Biology Lesson 3: Cell Organelles</p>		<p>Recognize the major organelles in plant and animal cells and describe their function.</p> <p>Understand how the structure of an organelle relates to the function of</p>

		<p>that organelle.</p> <p>Identify the parts of a cell where most chemical reactions essential to life take place.</p>
<p>Unit 3: Cell Biology Lesson 4: Two Types of Cells</p>		<p>Compare and contrast prokaryotic cells and eukaryotic cells.</p> <p>Explain that prokaryotic cells do not contain a nucleus or membrane-bound organelles.</p> <p>Explain that in eukaryotic cells, most of the DNA is located in the nucleus.</p> <p>Given examples, determine if the cell shown is a prokaryote or a eukaryote.</p>
<p>Unit 3: Cell Biology Lesson 5: Your Choice</p>		
<p>Unit 3: Cell Biology Lesson 6: Cell Membrane Structure</p>		<p>Describe how cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</p>
<p>Unit 3: Cell Biology Lesson 7: Movement Across Membranes</p>		<p>Describe how one challenge that organisms face is exchanging materials and energy between themselves and their environment. Explain some of the ways that cells interact with their environment and why this interaction is critical for survival. Explain that nutrients, water, oxygen, carbon dioxide, and waste products must leave and enter the cell through the cell membrane. Describe the processes of passive transport and active transport.</p>
<p>Unit 3: Cell Biology Lesson 8: Passive Transport</p>		<p>Compare and contrast prokaryotic cells and eukaryotic cells.</p> <p>Explain that prokaryotic cells do not contain a nucleus or membrane-bound organelles.</p> <p>Distinguish between active transport and passive transport.</p> <p>Compare and contrast osmosis and diffusion.</p>

		Apply the concept of homeostasis to the processes of osmosis and diffusion.
Unit 3: Cell Biology Lesson 9: Active Transport		Discuss the role of the cell membrane in maintaining homeostasis. Describe some processes of active transport across membranes.
Unit 3: Cell Biology Lesson 10: Laboratory: Determining the Rate of Diffusion 1		Understand how the process of diffusion occurs in cells. Apply the concept of homeostasis to the process of diffusion. Understand how the surface area-to-volume ratio of a cell affects diffusion of materials into that cell. Conduct an experiment, and gather and analyze data.
Unit 3: Cell Biology Lesson 11: Laboratory: Determining the Rate of Diffusion 2		
Unit 3: Cell Biology Lesson 12: Your Choice		
Unit 3: Cell Biology Lesson 13: Mid-Unit Test	HS-LS1-2	
Unit 3: Cell Biology Lesson 14: Glycolysis and Fermentation		Describe cellular (aerobic) respiration. Explain that in cellular respiration, oxygen is consumed and carbon dioxide and water are released. Explain the functions of glycolysis and fermentation. Understand that fermentation does not use oxygen and does not break down glucose as completely as cellular respiration, and therefore it does not recover as much of the chemical energy in glucose.

<p>Unit 3: Cell Biology Lesson 15: The Krebs Cycle</p>		<p>Explain that organisms need energy to live. Some living things use sunlight for energy. Others get it from consuming other life-forms.</p> <p>Explain that the mitochondria contain most of the metabolic equipment for cellular respiration.</p> <p>Interpret a diagram of the Krebs cycle and discuss how the Krebs cycle relates to the production ATP for cell energy.</p>
<p>Unit 3: Cell Biology Lesson 16: The Electron Transport Chain</p>		<p>Interpret a diagram of the electron transport chain.</p> <p>Discuss how the electron transport chain is related to the production of ATP for cell energy.</p>
<p>Unit 3: Cell Biology Lesson 17: Light and Photosynthesis</p>		<p>Describe the role of the chloroplast in providing energy for cellular growth, development, and repair.</p> <p>Describe the function of the light-dependent reactions of photosynthesis.</p> <p>Interpret a diagram of the light-dependent reactions of photosynthesis.</p> <p>Define photosynthesis as the process in which plants convert solar energy to chemical energy in the form of glucose.</p>
<p>Unit 3: Cell Biology Lesson 18: Photosynthesis and Glucose</p>		<p>Describe the role of the chloroplast in providing energy for cellular growth, development, and repair.</p> <p>Interpret a diagram of the light-independent reactions of photosynthesis.</p> <p>Describe the function of the light-independent reactions of photosynthesis.</p>

<p>Unit 3: Cell Biology Lesson 19: Chemical Energy and Life</p>		<p>Describe how living things convert some forms of energy into the chemical energy of those compounds that support life.</p> <p>Understand that living organisms need energy to live.</p> <p>Explain that some living things use sunlight for energy, while others get energy from consuming other life-forms.</p> <p>Explain that living things convert some forms of energy into the chemical energy of those compounds that support life.</p>
<p>Unit 3: Cell Biology Lesson 20: Respiration and Photosynthesis</p>		<p>Discuss the relationship between cellular respiration and photosynthesis.</p> <p>Describe what products cellular respiration and photosynthesis use and release.</p> <p>Explain that the chemical energy that is gathered from glucose during cellular respiration is used to replenish the ATP in the cell.</p> <p>Explain how the chemical bonds of glucose are broken during processes that either use oxygen or do not use oxygen.</p>
<p>Unit 3: Cell Biology Lesson 21: Lab: The Rate of Photosynthesis 1</p>	<p>HS-LS1-5</p>	<p>Explain that glucose is formed during photosynthesis, a process in which plants use light energy from the sun to form glucose from carbon dioxide and water.</p> <p>Perform an experiment to determine some factors that affect the rate of photosynthesis.</p>

<p>Unit 3: Cell Biology Lesson 23: Reproduction and Development</p>		<p>Explain that cells must replicate for an organism to grow and develop.</p> <p>Understand that mitosis and meiosis are two processes that help with growth and development.</p> <p>Draw a diagram to show how a chromosome forms from the winding of DNA.</p> <p>Discuss the relationship between chromosomes and genes.</p> <p>Explain that reproduction is the characteristic of life that allows for the continuation of a species and creates variety in a population.</p>
<p>Unit 3: Cell Biology Lesson 24: Mitosis</p>	<p>HS-LS1-2, HS-LS1-4</p>	<p>Describe mitosis and cytokinesis, and explain their function: to produce identical gametes to sustain an organism.</p> <p>Understand that a cell's genetic material divides in half during mitosis and finishes during cytokinesis, resulting in two gametes that are identical to the body cell.</p> <p>Explain that during cell division, body cells replicate their nuclei in a process called mitosis.</p>
<p>Unit 3: Cell Biology Lesson 25: Laboratory: Observing Mitosis</p>		<p>Prepare a slide using an onion root.</p> <p>Observe stages of mitosis in a provided slide of an onion root tip.</p>
<p>Unit 3: Cell Biology Lesson 26: Cell Differentiation</p>		<p>Explain that differentiation is the process of cells becoming specialized. Multicell organisms start as one or more very similar cells. Those cells undergo changes by which they become different.</p> <p>Understand that cell differentiation is necessary if cells are to become specialized.</p> <p>Explain that without cell differentiation, all cells would be identical; there would not be different cells with specific functions.</p>

		<p>Explain the importance of specialized cells to organisms.</p> <p>Describe the processes of cell division and cell differentiation.</p>
Unit 3: Cell Biology Lesson 27: Cell Specialization		<p>Recognize the three major structural levels: tissues, organs, and systems. Explain that multicellularity allows an organism to function as a collection of cells working together, rather than individually. Explain that complex multicell organisms are formed as highly organized arrangements of differentiated cells.</p>
Unit 3: Cell Biology Lesson 28: Sexual Reproduction		<p>Explain how sexual reproduction allows organisms to produce genetically diverse offspring.</p> <p>Explain how two parents produce offspring that have unique combinations of genes inherited from both parents.</p> <p>Explain how when two haploid gametes come together at fertilization, the original number of chromosomes is reinstated.</p>
Unit 3: Cell Biology Lesson 29: Meiosis 1		<p>Interpret a diagram showing crossing-over.</p> <p>Understand that meiosis is a process by which the genetic material in a cell is divided among gametes.</p> <p>Compare and contrast the function and process of cell division (mitosis) with the production of gametes (meiosis).</p> <p>Describe how meiosis results in gametes that have half the genetic material of the body cells.</p>

		<p>Understand that meiosis is a process by which the genetic material in a cell divides among gametes.</p>
<p>Unit 3: Cell Biology Lesson 30: Meiosis 2</p>		<p>Interpret a diagram showing crossing-over.</p> <p>Compare and contrast the function and process of cell division (mitosis) with the production of gametes (meiosis).</p> <p>Describe how meiosis results in gametes that have half the genetic material of the body cells.</p> <p>Understand that meiosis is a process by which the genetic material in a cell divides among gametes.</p> <p>Explain how, in animals, the cells that form during meiosis differentiate to form gametes</p>
<p>Unit 3: Cell Biology Lesson 31: Your Choice</p>		
<p>Unit 3: Cell Biology Lesson 32: Unit Test</p>	<p>HS-LS1-2, HS-LS1-3, HS-LS1-4,HS-LS1-5,HS-LS1-6</p>	

<p>Unit 4: Mendelian Genetics Lesson 1: The Work of Gregor Mendel</p>		<p>Know the genetic basis for Mendel's laws of segregation and independent assortment.</p> <p>Explain that a unit of hereditary information is called a gene, and that genes may occur in different forms called alleles.</p> <p>Explain how the fundamental rules of inheritance began with the work of Gregor Mendel and have been modified since their initial discovery.</p> <p>Describe Mendel's experiments that led to the laws of segregation and independent assortment.</p> <p>Compare and contrast the concepts of dominant and recessive traits.</p>
<p>Unit 4: Mendelian Genetics Lesson 2: Mendelian Inheritance</p>		<p>Know the genetic basis for Mendel's laws of segregation and independent assortment.</p> <p>Explain that a unit of hereditary information is called a gene, and that genes may occur in different forms called alleles.</p> <p>Explain how the fundamental rules of inheritance began with the work of Gregor Mendel and have been modified since their initial discovery.</p> <p>Describe Mendel's experiments that led to the laws of segregation and independent assortment.</p> <p>Compare and contrast the concepts of dominant and recessive traits.</p>
<p>Unit 4: Mendelian Genetics Lesson 3: Laboratory: Genetic Crosses 1</p>	<p>HS-LS3-1, HS-LS3-2, HS-LS3-3</p>	<p>Predict the probable outcome of phenotypes in a genetic cross given the genotypes of the parents.</p> <p>Predict the probable outcome of phenotypes and genotypes in a genetic cross given the genotypes of the parents.</p>

<p>Unit 4: Mendelian Genetics Lesson 4: Laboratory: Genetic Crosses 2</p>	<p>HS-LS3-1,HS-LS3-2, HS-LS3-3</p>	<p>Predict the probable outcome of phenotypes in a genetic cross given the genotypes of the parents.</p> <p>Predict the probable outcome of phenotypes and genotypes in a genetic cross given the genotypes of the parents.</p>
<p>Unit 4: Mendelian Genetics Lesson 5: Pedigrees</p>		<p>Predict the mode of inheritance that can be determined from a pedigree.</p>
<p>Unit 4: Mendelian Genetics Lesson 6: Laboratory: Gene Mapping</p>	<p>HS-LS3-1,HS-LS3-2, HS-LS3-3</p>	<p>Use data on recombination frequency at meiosis to construct a genetic map.</p>
<p>Unit 4: Mendelian Genetics Lesson 7: Chromosomes and Genes</p>		<p>Discuss the relationship between chromosomes and genes.</p> <p>Explain that genes control all aspects of cell life and are the vehicle by which genetic information is passed to the next generation.</p>
<p>Unit 4: Mendelian Genetics Lesson 8: Genes and Alleles</p>		<p>Describe the relationship between a gene and an allele.</p>
<p>Unit 4: Mendelian Genetics Lesson 9: Genetic Variation</p>		<p>Show how new combinations of genes result in genetic variation.</p> <p>Discuss how crossing-over leads to greater variability of phenotypes.</p>
<p>Unit 4: Mendelian Genetics Lesson 10: Unit Test</p>	<p>HS-LS3-1,HS-LS3-2, HS-LS3-3</p>	
<p>Unit 5: Molecular Genetics Lesson 1: DNA, RNA, and Proteins</p>		<p>Know that the Central Dogma of biology outlines the flow of information from transcription of RNA in the nucleus to translation of proteins on ribosomes in the cytoplasm.</p> <p>Explain how the flow of genetic information can be summarized in the Central Dogma of biology: DNA is transcribed into RNA, and RNA is translated into proteins.</p> <p>Know that the two main stages of protein production are transcription and translation.</p>

<p>Unit 5: Molecular Genetics Lesson 2: Structure of DNA</p>		<p>Describe what is meant by the genetic code, and explain its universal nature among living things.</p> <p>Explain that nucleic acids store information about how to build and run an organism.</p> <p>Understand that there are two types of nucleic acids: DNA and RNA.</p> <p>Explain that nucleic acids are the primary tools for sending information to the next generation.</p> <p>Explain that DNA is a double-stranded molecule that forms a double helix.</p> <p>Understand that nitrogenous bases from one strand of DNA bond to bases on the other strand in a very specific way.</p>
<p>Unit 5: Molecular Genetics Lesson 3: Structures of RNA</p>		<p>Explain that nucleic acids store information about how to build and run an organism.</p> <p>Understand that there are two types of nucleic acids: DNA and RNA.</p> <p>Explain the main differences between DNA and RNA.</p> <p>Explain that most types of RNA exist as single-stranded molecules.</p> <p>Relate the structure of RNA to its function.</p>
<p>Unit 5: Molecular Genetics Lesson 4: DNA Replication</p>		<p>Describe how the way DNA replicates is the basis for inheritance.</p> <p>Explain that when DNA replicates, the two strands separate and each strand serves as a template for a new strand.</p> <p>Apply base-pairing rules to explain precise copying of DNA during replication.</p>
<p>Unit 5: Molecular Genetics Lesson 5: Transcription</p>		<p>Describe the process of DNA transcription to RNA.</p>

		Apply base-pairing rules to explain precise RNA synthesis.
Unit 5: Molecular Genetics Lesson 6: Laboratory: Modeling DNA	HS-LS1-1	Determine the accurate pairing of nitrogenous bases. Construct a model of DNA.
Unit 5: Molecular Genetics Lesson 7: Laboratory: Modeling DNA Replication	HS-LS1-1	Show how a new strand of DNA is the exact copy of the original DNA molecule. Construct a model of DNA replication.
Unit 5: Molecular Genetics Lesson 8: DNA Makes RNA		Describe the relationship between the different types of RNA, and explain the function and importance of each one. Describe the process by which RNA migrates out of the nucleus to the ribosomes.
Unit 5: Molecular Genetics Lesson 9: RNA Makes Protein		Understand the general pathway by which ribosomes synthesize proteins. Interpret a diagram of protein synthesis.
Unit 5: Molecular Genetics Lesson 10: The Genetic Code		Use the genetic code to determine a sequence of amino acids from a sequence of mRNA codons. Describe and summarize how the sequence of bases of DNA is the key to protein synthesis.
Unit 5: Molecular Genetics Lesson 11: Your Choice		
Unit 5: Molecular Genetics Lesson 12: Unit Test	HS-LS1-1, HS-ETS-2	
Unit 6: Semester Review and Test Lesson 1: Semester Review		
Unit 6: Semester Review and Test Lesson 2: Your Choice		
Unit 6: Semester 1 Review and Test Lesson 3: Your Choice		
Unit 6: Semester Review and Test Lesson 4: Semester Test		

<p>Unit 7: Honors Project 1: Research Paper Lesson 1: Planning Your Research Paper</p>		<p>Respond to a research paper.</p> <p>Choose a topic for a research paper.</p> <p>Make a list of questions about a research topic.</p>
<p>Unit 7: Honors Project 1: Research Paper Lesson 2: Finding and Using Information for Your Paper</p>		<p>Use the library and the Internet for research.</p> <p>Evaluate research sources and conduct research.</p> <p>Evaluate Internet sources.</p> <p>Use index cards, create bibliography cards, and take notes.</p> <p>Create bibliography cards.</p> <p>Identify instances of plagiarism.</p> <p>Take notes on index cards.</p> <p>Understand plagiarism.</p>
<p>Unit 7: Honors Project 1: Research Paper Lesson 3: Organizing Notes and Developing an Outline</p>		<p>Write a thesis statement.</p> <p>Determine a pattern of organization.</p> <p>Organize note cards.</p> <p>Make a formal outline.</p> <p>Create an outline for a research paper that includes a thesis statement, plans for introductory and supporting material, and a conclusion.</p>
<p>Unit 7: Honors Project 1: Research Paper Lesson 4: Writing Your Paper</p>		<p>Draft and revise a research paper.</p> <p>Draft a research paper.</p> <p>Include citations within the body of the paper.</p>
<p>Unit 7: Honors Project 1: Research Paper Lesson 5: Creating a Works Cited Page</p>		<p>Create a Works Cited page.</p> <p>Write a final draft of a research paper that includes properly cited resources both in text and on a Works Cited page.</p>

<p>Unit 7: Honors Project 1: Research Paper Lesson 6: Revising and Proofreading Your Paper</p>	<p>HS-ETS1-5</p>	<p>Revise a research paper.</p> <p>Write a final draft of a research paper that includes properly cited resources both in text and on a Works Cited page.</p> <p>Proofread and polish a research paper.</p> <p>Create a final draft of a research paper.</p>
<p>Unit 8: Honors Project 2: Lab: Rate of Photosynthesis Lesson 1: Lab: The Rate of Photosynthesis 1</p>		<p>Explain that glucose is formed during photosynthesis, a process in which plants use light energy from the sun to form glucose from carbon dioxide and water.</p> <p>Perform an experiment to determine some factors that affect the rate of photosynthesis.</p>
<p>Unit 8: Honors Project 2: Lab: Rate of Photosynthesis Lesson 2: Lab: The Rate of Photosynthesis 2</p>		<p>Explain that glucose is formed during photosynthesis, a process in which plants use light energy from the sun to form glucose from carbon dioxide and water.</p> <p>Perform an experiment to determine some factors that affect the rate of photosynthesis.</p>
<p>Unit 8: Honors Project 2: Lab: Rate of Photosynthesis Lesson 3: Discuss: The Rate of Photosynthesis</p>		<p>Explain that glucose is formed during photosynthesis, a process in which plants use light energy from the sun to form glucose from carbon dioxide and water.</p> <p>Perform an experiment to determine some factors that affect the rate of photosynthesis.</p>