TaG Biology I Curriculum Differentiation

Biology I - Semester I Unit I

Components	Biology I	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Science of Biology		
Short Descriptive Overview	Students will be introduced to the scientific method, develop an overview of life's properties, and learn to use biological laboratory tools.		
TEKS	1A Students will demonstrate safe practices during field and laboratory investigation 2A Students will plan and implement investigative procedures 2B Students will collect data and make measurements with precision; 2C Students will organize, analyze, evaluate, make inferences, and predict trends from data; 2D Students will communicate valid conclusions. 3A Students will analyze, review, and critique scientific explanations, as to their strengths and weaknesses using scientific evidence and information; 3D The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to describe connections between physics and chemistry. 4B The student will investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules. 7D (IPC)The student will relate the chemical behavior of an element including bonding to its placement on the periodic table. 7E (IPC) The student will classify samples of matter from everyday life as being elements, compounds, or mixtures.		

	9A The student will relate the structure of water to its function as the universal solvent. 9B The student will relate the concentration of ions in a solution to physical and chemical properties such as pH, electrolytic behavior, and reactivity.		
TAKS Connections	Objective 1: The student will demonstrate an understanding of the nature of science.		
Generalizations/Enduring Understandings	The scientific knowledge of the properties of life expands through the use of inquiry.		
Guiding/Essential Questions	What is the goal of science? How do scientists test hypotheses? How does a scientific theory develop? What are some characteristics of living things? How can life be studied at different levels? What measurement system do most scientists use? How are light microscopes and electron microscopes similar? How are they different.		
Concepts	Scientific method Properties of life Tools of biologists		
Topics	Biologists use specific tools and employ the scientific method to explore the properties of life.		
Essential Facts	Scientists test hypotheses with controlled experiments and develop theories only when conclusions are consistent. All living things are able to use energy, grow, reproduce, achieve homeostasis and exchange materials with their environments. Biologists use the compound microscope to investigate life on a cellular level.		
Processes and Skills	Gathering data, graphing data, interpreting data, distinguishing observations from inferences, using laboratory equipment properly.		
Language of Instruction	Observation, data, inference, hypothesis, theory, controlled experiment, spontaneous	Dependent vs. independent variables	Dependent vs. independent variables

	generation, homeostasis, metabolism, cell, control, variable		
Student Investigations/Student Products			Concept Map of Lab Equipment
Suggested Laboratory Investigations	Scientific Method – One Variable *(Blue Bottle Lab)* *Dancing Raisin* Lab, Equipment Survey Activity	*Crickets and Cantaloupe* Lab (many variables) *Disproving Spontaneous Generation 1* (reinforcement of controls and variables with a 2-flask set up and a duration of 5 days)	*Crickets and Cantaloupe* Lab (many variables) *Disproving Spontaneous Generation 2* (multiple variables: 8 test tube set-up and duration of 7 days)
Other Resources	TAKS Tune-up book		
Textbook Correlation	Prentice Hall Chapter 1, sections 1,2,3,4		BSCS *Molecules to Man* Prologue
In-depth Study/Research Opportunity			
Challenge/Extension			Students will be exposed to multiple variables in a single experiment. Students must deduce the function of chemical indicators by analyzing data. In prior lab experiences, students have know the function of the indicator; now, in depth thinking must be used to analyze real data and draw conclusions.

Biology I - Semester I Unit II

Components	Biology I	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Chemistry of Living Systems		
Short Descriptive Overview	Students will identify subatomic particles of atoms, explain the differences in isotopes, explain what chemical compounds are, and describe chemical bonds. Students will understand that water is a polar substance, differentiate between solutions and suspensions, and explain pH levels. Students will recognize and understand carbon compounds (macromolecules).	Students should relate polar covalent bonds between hydrogen and oxygen to the overall polarity of water. Students should be able to identify the carboxyl and amino functional groups in structural formulas. Students should be able to predict the properties and experimental outcomes when testing macromolecules with indicators.	Students should relate polar covalent bonds between hydrogen and oxygen to the overall polarity of water. Students should be able to identify the carboxyl and amino functional groups in structural formulas. Students should be able to predict the properties and experimental outcomes when testing macromolecules with indicators.
TEKS	1A Students will demonstrate safe practices during field and laboratory investigation 2A Students will plan and implement investigative procedures 2B Students will collect data and make measurements with precision; 2C Students will organize, analyze, evaluate, make inferences, and predict trends from data; 2D Students will communicate valid conclusions. 3A Students will analyze, review, and critique scientific explanations, as to their strengths and weaknesses using scientific evidence and information; 3C Students will evaluate the impact of research on scientific thought, society, and the environment		
TAKS Connections	Objective 1: The student will demonstrate an understanding of the nature of science. Objective 2: The student will demonstrate an understanding of the organization of living systems. Objective 4 (IPC): The student will demonstrate an understanding of the structures and properties of matter.		
Generalizations/Enduring	The understanding of living systems is		

Understandings	fundamentally tied to knowledge of atomic structure and the interactions among molecules.		
Guiding/Essential Questions	What three subatomic particles make up atoms? How are all of the isotopes of an element similar? What are the two main types of chemical bonds? Why are water molecules polar? What are acidic/basic solutions? What are the functions of each group of organic compounds?		
Concepts	Atomic structure Chemical bonding pH Macromolecule structure and function		
Topics	Atomic structure dictates the interaction in molecules and their properties.		
Essential Facts	The subatomic particles that make up atoms are protons, neutrons and electrons. The interaction between atoms in molecules creates either covalent or ionic bonding. Water molecules are polar because of the unequal distribution of charge in the hydrogen and oxygen atoms. Acidic solutions have higher concentrations of H^+ than pure water and have pH values below seven. Basic solutions have lower concentrations of H^+ than pure water and have pH values above seven. The four groups of organic macromolecules found in living systems are carbohydrates, proteins, lipids, and nucleic acids. Living systems use carbohydrates for structural purposes and as their main source of energy. Proteins build tissues, help fight disease and act as enzymes to regulate chemical reactions. Lipids can be used to store energy, are		

	important components of membranes, and serve as good waterproof barriers. Nucleic acids store and transmit the genetic code of a cell.		
Processes and Skills	Gathering data, graphing data, interpreting data, distinguishing observations from inferences, using laboratory equipment properly. Determining pH; observing enzymatically controlled reactions; distinguishing among the structural formulas of different macromolecules; predicting bond capacity for atoms from their structure		
Language of Instruction	Atom, nucleus, electron, element, isotope, compound, ionic bond, ion, covalent bond, molecule, cohesion, adhesion, mixture, solution, solute, solvent, suspension, pH scale, acid, base, buffer, monomer, polymer, carbohydrate, monosaccharide, polysaccharide, lipid, nucleic acid, nucleotide, DNA, RNA, protein, amino acid, dehydration synthesis, hydrolysis	Functional group, "R" group, carboxyl group, amino group	Functional group, "R" group, carboxyl group, amino group
Student Investigations/Student Products			Students will manipulate molecular model kits to build functional groups.
Suggested Laboratory Investigations	*Determining pH of Biological Substances,* *Investigating Properties of Macromolecules*	*Testing Lipids* *Investigating Carbohydrates* *Testing Proteins* *Identifying Organic Compounds found in Foods* *Nutrition* (reading nutritional labels activity)	*Testing Lipids* *Investigating Carbohydrates* *Testing Proteins* *Identifying Organic Compounds found in Foods* *Nutrition* (reading nutritional labels activity)
Other Resources	TAKS Tune-up book	*Unraveling the Mystery of Protein Folding* article	*Unraveling the Mystery of Protein Folding* article
Textbook Correlation	Prentice Hall Chapter 2 sections 1-2		BSCS *Molecules to Man* Chapter 1
In-depth Study/Research Opportunity			Research properties of alternate sweeteners such as Saccharine, Aspartame, Sucralose, and Cyclamates
Challenge/Extension			Students use prior lab knowledge to perform an independent analysis of their own lunch to determine the organic compounds present. They work in teams and develop their first formal lab report.

Biology I - Semester I Unit III

Components	Biology I	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Energy Changes of Living Systems		
Short Descriptive Overview	Students will explain chemical reactions, understand energy changes during reactions, and explain why enzymes are important to living things.		
TEKS	1A Students will demonstrate safe practices during field and laboratory investigation 2A Students will plan and implement investigative procedures 2B Students will collect data and make measurements with precision; 2C Students will organize, analyze, evaluate, make inferences, and predict trends from data; 2D Students will communicate valid conclusions. 3A Students will analyze, review, and critique scientific explanations, as to their strengths and weaknesses using scientific evidence and information; 3C Students will evaluate the impact of research on scientific thought, society, and the environment 10 Science concepts. The student knows that, at all levels of nature, living systems are found within other living systems, each with its own boundary and limits. The student is expected to: (A) interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune; 11A The student knows that organisms maintain homeostasis. The student is expected to identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis.		
TAKS Connections	Objective 1: The student will demonstrate		

	an understanding of the nature of science. Objective 2: The student will demonstrate an understanding of the organization of living systems.		
Generalizations/Enduring Understandings	Chemical reactions in cells are dependent on the action of enzymes and because of this catalysis, metabolism, a basic property of all living things, is possible.		
Guiding/Essential Questions	What happens to chemical bonds during chemical reactions? How do energy changes affect whether a chemical reaction will occur? Why are enzymes important to living things?		
Concepts	Enzyme structure and function Metabolism, Digestion		
Topics	Cellular metabolism involves building and degrading macromolecules and this chemistry is driven by the action of enzymes.		
Essential Facts	Chemical reactions in cells involve the rearrangement of chemical bonds. Chemical reactions that release energy may occur spontaneously and chemical reactions that absorb energy require a source of cellular energy. Enzymes speed up the chemical reactions that occur in cells.		
Processes and Skills	Gathering data, graphing data, interpreting data, distinguishing observations from inferences, using laboratory equipment properly. Determining pH; observing enzymatically controlled reactions; distinguishing among the structural formulas of different macromolecules; predicting bond capacity for atoms from their structure		
Language of Instruction	chemical reaction, reactant, product, activation energy, catalyst, enzyme, substrate, mouth, pharynx, esophagus, stomach, small intestine, large intestine, liver, pancreas, gall bladder	Feedback inhibition, allosteric sites	Feedback inhibition, allosteric sites
Student Investigations/Student Products			Flip-book to model Enzyme Properties

Suggested Laboratory Investigations	*The Action of Common Enzymes* (catalase or catecholase in apple/liver tissue– one variable only investigations)	*Catalase Activity* (effects of multiple variables on enzyme activity) *Salivary Amylase Activity*	*Catalase Activity* (effects of multiple variables on enzyme activity) *Salivary Amylase Activity* *Enzymes in Laundry Detergent* *Pineapple Jello* (effects of bromelase on protein)
Other Resources	TAKS Tune-up book		
Textbook Correlation	Prentice Hall Chapter 2 sections 3-4		BSCS *Molecules to Man* Chapter 2
In-depth Study/Research Opportunity			Research specific enzymes used in everyday life: Papain, Catecholase, Lactase
Challenge/Extension			Create their own lab using enzymes they have researched outside of class; hypothesize, and do a formal lab write up

Biology I - Semester I Unit IV

Components	Biology I	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Cells and Cellular Mechanisms		
Short Descriptive Overview	Students will distinguish between prokaryotic and eukaryotic cells. Students will demonstrate a basic understanding of cell structure and function. Students will learn about cell specialization and identify the levels of organization in the multicellular organism. Students will describe the properties of the plasma membrane and explain its role in the cell. Students will define diffusion and osmosis. Students will explain the effects of diffusion and osmosis on cells. Students will contrast passive and active transport in cells. Students will identify the parts of the cell cycle and differentiate normal cell cycles from cancer cell cycles. Students will understand how cells grow and divide. Students will learn the phases of mitosis. Students will contrast plant and animal cell mitosis.	Students will understand checkpoints in the cell cycle and how this can relate to the development of cancer.	Students will understand checkpoints in the cell cycle and how this can relate to the development of cancer.
TEKS	1A Students will demonstrate safe practices during field and laboratory investigations. 2A Students will plan and implement investigative procedures 2C Students will organize, analyze, evaluate, make inferences, and predict trends from data; 3C Students will evaluate the impact of research on scientific thought, society, and the environment. 3D The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to describe connections between physics and chemistry		

	3F The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to research and describe the history of biology and contributions of scientists. 4A The students will identify the parts of prokaryotic and eukaryotic cells. 4B The students will investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules. 5C The students will sequence the levels of organization in multicellular organisms to relate the parts to each other and to the whole. 11B The student knows that organisms maintain homeostasis, the student is expected to investigate and identify how organisms, including humans, respond to external stimuli.		
TAKS Connections	Objective 2: The student will demonstrate an understanding of the organization of living systems.		
Generalizations/Enduring Understandings	The cell is the basic structural and functional unit of all living systems and growth of the organism is dependent on cell division. The physical properties of molecular motion influence transport into and out of cells.		
Guiding/Essential Questions	What is the cell theory? What are the characteristics of prokaryotes and eukaryotes? What are the functions of the major cell structures? What are the main functions of the cell membrane and cell wall? What happens during diffusion? What is osmosis? What is cell specialization? What are the four levels of organization in multicellular organisms?		

	What problems does growth cause for cells? What are the main events of the cell cycle? What are the four phases of mitosis? How is the cell cycle regulated? How are cancer cells different from other cells?		
Concepts	Cell structure and function Membrane properties and transport Osmosis and diffusion Cell cycle and mitosis		
Topics	The functioning of an organism is reliant on the properties and activities of each individual cell in the organism.		
Essential Facts	The cell theory states that all living things are composed of cells, cells are the basic units of structure and function in living things, and new cells are produced from existing cells. Prokaryotic cells have genetic material that is not contained in a nucleus. Eukaryotic cells contain a nucleus in which their genetic material is separated from the rest of the cell. The nucleus contains nearly all the cell's DNA and the coded instructions for making proteins and other important molecules. Proteins are assembled on ribosomes. One type of endoplasmic reticulum makes membranes and secretory proteins. The other type of ER makes lipids and helps to detoxify or remove harmful substances. The Golgi apparatus modifies, sorts, and packages proteins and other materials from the ER for storage or secretion outside the cell. Mitochondria convert the chemical energy stored in food into compounds that are more convenient for the cell to use. Chloroplasts capture the energy from sunlight and convert it into chemical energy. The cytoskeleton is a network of protein filaments that helps the cell to maintain its shape. The cytoskeleton is also involved in	Cancer cells do not respond to the signals that regulate the growth of most cells.	Cancer cells do not respond to the signals that regulate the growth of most cells.

	movement of materials within and outside the cell. All cells have a cell membrane. The cell membrane regulates what enters and leaves the cell and also provides protection and support. Some cells also have cell walls. Cell walls provide additional support and protection. Diffusion causes many substances to move across a cell membrane but does not require the cell to use energy. Osmosis is the diffusion of water through a selectively permeable membrane. Cells in multicellular organisms develop in different ways to perform particular functions within the organism. The levels of organization in a multicellular organism are individual cells, tissues, organs, and organ systems. The larger a cell becomes, the more demands the cell places on its DNA. In addition, the cell has more trouble moving enough nutrients and wastes across the cell membrane. During the cell cycle, a cell grows, prepares for division, and divides to form two daughter cells. Each of which then begins the cycle again. Biologists divide the events of mitosis into four phases: prophase, metaphase, anaphase, and telophase. Mitosis insures that each daughter cell has the same genetic information as the parent cell.		
Processes and Skills	Gathering data, graphing data, interpreting data, distinguishing observations from inferences, using laboratory equipment properly. Exploring the components of the cell. Distinguishing between cell types and functions. Identifying functions of organelles. Describing the processes of osmosis and diffusion. Idntifying the organization levels in		

	multicellular organisms Explaining the steps of cell division and the cell cycle and how each is regulated.. .		
Language of Instruction	Cell, cell theory, nucleus, eukaryote, prokaryote, organelle, cytoplasm, nuclear envelope, chromatin, chromosome, nucleolus, ribosome, endoplasmic reticulum, Golgi apparatus, lysosome, vacuole, mitochondrion, chloroplast, cytoskeleton, centriole. Lipid bilayer, diffusion, equilibrium, osmosis, isotonic, hypertonic, hypotonic, facilitated diffusion, active transport, endocytosis, phagocytosis, pinocytosis, exocytosis, tissue, organ, organ system, mitosis, cytokinesis, chromatid, centromere, interphase, cell cycle, prophase, centriole, spindle, metaphase, anaphase, telophase, cancer		
Student Investigations/Student Products	*Sell a Cell Organelle Advertisement* Project,		Demonstrate proficiency in locating and focusing a specimen on a slide (lab practical)
Suggested Laboratory Investigations	*Microscope Use*, *Observation of Plant and Animal Cells*, *Diffusion through Dialysis Tubing*, *Osmosis* (potato or egg model) *Mitosis* (using micro viewer or microscope slides of onion root tip)	*Microscope Use and Measurement* *Observing Plant vs. Animal Cells* *Closed Box Mystery* (diffusion) *My Egg, My Cell* (osmosis) *Observing Cells in a Changing Environment* *Time for Mitosis*	*Microscope Use and Measurement* *Observing Plant vs. Animal Cells* Closed Box Mystery (diffusion) *My Egg, My Cell* (osmosis) *Observing Cells in a Changing Environment* *Time for Mitosis* *A Quantitative Investigation into Osmosis* (potato and sugar concentration lab) Dry Lab – *Kidney and Homeostasis*
Other Resources	TAKS Tune-up book		BSCS Teacher's Resource Book – Research Problems in Biology
Textbook Correlation	Prentice Hall Chapters 7 & 10		BSCS Chapters 3 & 6
In-depth Study/Research Opportunity			*The Molecular Biology of Cancer* (BSCS Biology Teacher Resource Book) *Coming to Grips with the Golgi* – Current Literature Article
Challenge/Extension			Extension of *Sell a Cell Organelle* Project - advertisement

Biology I - Semester I Unit V

Components	Biology I	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Autotrophy and Heterotrophy		
Short Descriptive Overview	Students will understand how plants obtain energy and produce their own food. Students will be able to describe the structure of a chloroplast and relate the function of each of the parts in the reactions of photosynthesis. Students will evaluate the effects of various environmental factors on the rate of photosynthesis. Students will understand the importance of ATP as the energy molecule and realize that both plant and animal cells utilize this molecule. Students will be able to define cellular respiration and distinguish the two main types: aerobic and anaerobic.		
TEKS	1A Students will demonstrate safe practices during field and laboratory investigations. 2A Students will plan and implement investigative procedures 2B Students will collect data and make measurements with precision 2C Students will organize, analyze, evaluate, make inferences, and predict trends from data; 3C Students will evaluate the impact of research on scientific thought, society, and the environment. 3F The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to research and describe the history of biology and contributions of scientists 4B The students will investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular		

	parts, and synthesis of new molecules 9A Students will compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids. 9B Students will compare the energy flow in photosynthesis to the energy flow in cellular respiration. 11 C Students will investigate and identify the effects of enzymes on food molecules.		
TAKS Connections	Objective 1: The student will demonstrate an understanding of the nature of science. Objective 2: The student will demonstrate an understanding of the organization of living systems.		
Generalizations/Enduring Understandings	An important interaction between plants and animals is the exchange of gases that can occur through the processes of photosynthesis and respiration. All living organisms employ some form of respiration to fill energy needs.		
Guiding/Essential Questions	Where do plants get the energy they need to produce food? What is the role of ATP in cellular activities? What did the experiments of van Helmont, Priestley, and Ingenhous reveal about how plants grow? What is the overall equation for photosynthesis? What is the role of light and chlorophyll in photosynthesis? In which process of photosynthesis is oxygen generated? In which process of photosynthesis is glucose generated? What is the Calvin cycle? What is cellular respiration? What happens during the process of glycolysis? What are the two main types of fermentation? What the initial reactants and final products of the Krebs Cycle? How are high-energy electrons used by the electron transport chain?	What are the reactants, products, and processes of the Krebs Cycle? What are the specific roles of coenzymes? What is the path of electron flow in the light reactions?	What are the reactants, products, and processes of the Krebs Cycle? What is the specific role of coenzymes? What is the path of electron flow in the light reactions?

Concepts	Photosynthesis Fermentation Aerobic Respiration		
Topics	Plants convert the sun's energy into chemical energy through photosynthesis. This energy is then used by cells to perform work in a process called respiration.		
Essential Facts	Plants and some other types of organisms are able to use light energy from the sun to produce food. The characteristics of ATP make it exceptionally useful as the basic energy source of all cells. Photosynthesis uses the energy of sunlight to convert water and carbon dioxide into high-energy sugars and oxygen. In addition to water and carbon dioxide, photosynthesis requires light and chlorophyll, a molecule found in chloroplasts. The process of photosynthesis includes the light-dependent reactions as well as the Calvin cycle. The light-dependent reactions produce oxygen gas and convert ADP and NADP+ into ATP and NADPH. The light-dependent reactions occur in the thylakoid. The Calvin cycle uses ATP and NADPH from the light-dependent reactions to produce high-energy sugars. The Calvin cycle is also known as the light-independent pathway. Cellular respiration is the process that releases energy by breaking down glucose and other food molecules in the presence of oxygen. Glycolysis is the process in which one molecule of glucose is broken in half, producing two molecules of pyruvic acid, a 3-carbon compound. Glycolysis captures two pairs of high-energy electrons with the carrier NAD+. Because glycolysis does not require oxygen, it supplies chemical energy to cells	The distinction between photosystem I and photosytem II are the types of chlorophyll and the wavelengths they absorb.	The distinction between photosystem I and photosytem II are the types of chlorophyll and the wavelengths they absorb.

	when oxygen is not available. The two main types of fermentation are alcoholic fermentation and lactic acid fermentation. In the absence of oxygen, yeast and a few other microorganisms use alcoholic fermentation, forming ethyl alcohol and carbon dioxide as wastes. Animals cannot perform alcoholic fermentation, but some cells, such as human muscle cells, can convert glucose into lactic acid. This is called lactic acid fermentation. During the Krebs cycle, pyruvic acid is broken down into carbon dioxide in a series of energy-extracting reactions. The electron transport chain uses the high-energy electrons from the Krebs cycle to convert ADP into ATP. The products of photosynthesis are similar to the reactants of cellular respiration. The products of cellular respiration are the reactants of photosynthesis.		
Processes and Skills	Gathering data, graphing data, interpreting data, distinguishing observations from inferences, using laboratory equipment properly. Diagraming the pathway of sunlight to chemical energy. Describing the function of chloroplasts and mitochondria. Explaining autotrophy and heterotrophy. Stating the overall formula for photosynthesis and cellular respiration. Evaluating the different effects intensity and amount of light play on plant growth. Distinguishing between anaerobic and aerobic cellular respiration.		
Language of Instruction	Autotrophy, heterotroph, adenosine triphosphate, photosynthesis, pigment, chlorophyll, thylakoid, photosystem, stroma, NADP+, light-dependnt reactions, ATP synthase, Calvin cycle, calorie, glycolysis, cellular repiration, NAD+, fermentation, anaerobic, aerobic, Krebs cycle, electron transport chain		

Student Investigations/Student Products			
Suggested Laboratory Investigations	*Yeast Respiration*, *Photosynthesis*	*Calories in Nuts* *Yeast Respiration* (aerobic respiration) *Investigating Fermentation* (anaerobic respiration model) Dry Lab – *Effect of Oxygen on Bacterial Growth* *Effects of Light Intensity on Photosynthesis* (Elodea) *Rate of Respiration in Pea Seedlings*	*Calories in Nuts* *Yeast Respiration* (aerobic respiration) *Investigating Fermentation* (anaerobic respiration model) Dry Lab – *Effect of Oxygen on Bacterial Growth* *Effects of Light Intensity on Photosynthesis* (Elodea) *Rate of Respiration in Pea Seedlings*
Other Resources	TAKS Tune-up book		
Textbook Correlation	Prentice Hall Chapters 8 & 9		BSCS *Molecules to Man* Chapters 4 & 5
In-depth Study/Research Opportunity			
Challenge/Extension			Research role of fermentation in the production of foods, such as: yogurt, cheese, sauerkraut

Biology I - Semester II Unit XI

Components	Biology I	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Evolution		
Short Descriptive Overview	Students will be introduced to various theories of evolution and modern applications of evolution according to natural selection. Students will understand how classification of living things follows evolutionary patterns.		
TEKS	(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information; (C) evaluate the impact of research on scientific thought, society, and the environment; (F) research and describe the history of biology and contributions of scientists (6) Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to: (D) compare genetic variations observed in plants and animals; (7) Science concepts. The student knows the theory of biological evolution. The student is expected to: (A) identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology; and (B) illustrate the results of natural selection in speciation, diversity, phylogeny, adaptation, behavior, and extinction.		

TAKS Connections	Objective 1: The student will demonstrate an understanding of the nature of science. Objective 2: The student will demonstrate an understanding of the organization of living systems Objective 3: The student will demonstrate an understanding of the interdependence of organisms and the environment.		
Generalizations/Enduring Understandings	The understanding of taxonomy is fundamentally tied to how organisms evolved. Evolution of organisms is thought to occur because of natural selection.		
Guiding/Essential Questions	What was Charles Darwin's contribution to science? What was Lamarck's contribution to science? What patterns did Darwin observe among the organisms of the Galapagos Islands? What was Malthus' theory of population growth? How is natural selection similar to artificial selection? How is natural selection related to a species' fitness? What evidence of evolution did Darwin present? What are the six kingdoms of life? What are the defining characteristics of each kingdom?		
Concepts	Theories of Darwin and Lamarck Evidence for evolution Natural Selection Artificial Selection Speciation Population Dynamics Taxonomy (Kingdoms/classification)	Nebular Hypothesis Chemical Evolution Homologous vs. analogous Speciation Geologic Eras Thomas Malthus Macro evolution vs. Micro evolution	Nebular Hypothesis Chemical Evolution Homologous vs. analogous Speciation Geologic Eras Thomas Malthus Macro evolution vs. Micro evolution
Topics	Both Darwin and Lamarck presented important information concerning evolution of species. Darwin's theory of evolution by natural selection is the more enduring viewpoint, effectively explaining many changes in species. Knowledge of evolution has led scientists		

	to the current scheme of classifying organisms.		
Essential Facts	Charles Darwin made numerous observations and collected evidence that led him to propose a revolutionary hypothesis about the way life changes over time. Lamarck proposed that use or disuse of organs led to evolution of the species. Malthus reasoned that the environment could not support the number of organisms in each species produced each generation and therefore a struggle for survival ensues. In artificial selection, nature provides variation among organisms and humans select the variations they find useful. Over time, natural selection results in changes in the characteristics of a population. These changes increase a species fitness in its environment. Organisms are distinguished by particular characteristics specific to the kingdom in which they are assigned.	Evidence supports the fact that mitochondria and chloroplasts were once independent prokaryotic cells.	Evidence supports the fact that mitochondria and chloroplasts were once independent prokaryotic cells.
Processes and Skills	Identifying how species evolve, describing theories of population growth, listing events leading to Darwin's publication of the *Origin of the Species*, describing how natural variation is used in natural selection, explaining how natural selection is related to species fitness, classifying organisms into the appropriate kingdoms.		
Language of Instruction	Evolution, theory, fossil, artificial selection, fitness, adaptation, survival of the fittest, natural selection, homologous structure, vestigial organ, population dynamics, speciation, macroevolution, microevolution, punctuated equilibrium, binomial nomenclature, taxonomy, genus, family, order, class, phylum, kingdom, species	Endosymbiotic Theory	Endosymbiotic Theory
Student Investigations/Student Products			
Suggested Laboratory Investigations	*Variation in a Species* *Breakfast for the Birds* *Natural Selection Lab* *Salamander Activity* (dichotomous key)	*Camouflage as an Adaptation* *Variation in a Species* Dry Lab: *Investigating Natural Selection with the Peppered Moth*	*Camouflage as an Adaptation* *Variation in a Species*

	Activity – *Natural Selection and Human Skin Color* *Fossil Hunting on the Web* Activity *The Hand of Primates* Investigation	Dry Lab: *Biochemical Evidence for Evolution*	Dry Lab*: Investigating Natural Selection with the Peppered Moth* Dry Lab*: Biochemical Evidence for Evolution* Concept Webbing with Evolution *Formation of Coacervates* Lab
Other Resources	TAKS Tune-up Book		*"We've Seen The Future and it is Us"* article – Seed Magazine, Dec. 2006 *"The African Gene"* article – Science News, Vol. 140
Textbook Correlation	Prentice Hall Chapter 15, Chapter 16 section 3, Chapter 17 sections 2&4, Chapter 18		BSCS *Molecules to Man* Chapters 17-19
In-depth Study/Research Opportunity			
Challenge/Extension			Microbial Evolution and What the Future Holds Origin of Life Investigation – BSCS Ch. 17

Biology I - Semester II Unit VIII

Components	Biology I	Biology I Pre AP Extensions	Biology 1 Pre AP TaG Extensions
Unit Name	Molecular Basis of Inheritance		
Short Descriptive Overview	Students will summarize the relationship between genes and the DNA molecule, and describe its overall structure. Students will describe the structure of RNA and summarize its role in protein synthesis.		
TEKS	(2) Scientific processes. The student uses scientific methods during field and laboratory investigations. The student is expected to: C) organize, analyze, evaluate, make inferences, and predict trends from data (D) communicate valid conclusions (3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (E) evaluate models according to their adequacy in representing biological objects or events; (F) research and describe the history of biology and contributions of scientists (4) Science concepts. The student knows that cells are the basic structures of all living things and have specialized parts that perform specific functions, and that viruses are different from cells and have different properties and functions. The student is expected to: B) investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules; (6) Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to: (A) describe components of		

	deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA; (B) explain replication, transcription, and translation using models of DNA and ribonucleic acid (RNA); (C) identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes		
TAKS Connections	Objective 1: The student will demonstrate an understanding of the nature of science. Objective 2: The student will demonstrate an understanding of the organization of living systems Objective 3: The student will demonstrate an understanding of the interdependence of organisms and the environment.		
Generalizations/Enduring Understandings	The molecular basis of inheritance is in the intricate structure of DNA.		
Guiding/Essential Questions	What did scientists discover about the relationship between genes and DNA? What is the overall structure of the DNA molecule? What happens during DNA replication? What are the three main types of RNA? What is transcription? What is translation? What are mutations?		
Concepts	Structure of DNA DNA Replication Mutations Protein Synthesis Chromosome Structure Chromosome Abnormalities	Lac Operon (inducible)	Lac Operon (inducible)
Topics	Chromosomes are composed of DNA molecules which direct the production of protein, and changes in DNA (mutations) therefore alter the structure and function of proteins.		
Essential Facts	Scientists discovered that DNA is the molecule of inheritance by studying transmission of disease in mice.		

	Scientists concluded that DNA was the genetic material of viruses. Watson and Crick developed the double helix model of DNA. During DNA replication, strands of the molecule separate and complementary strands are newly formed. The three main types of RNA are messenger RNA, ribosomal RNA and transfer RNA. The action of RNA polymerase results in the formation of messenger RNA from DNA. Translation is the process whereby messenger RNA is decoded and ribosomes assemble protein. Mutations are changes in DNA.		
Processes and Skills	Gathering and interpreting data, describing components of the DNA molecule, sequencing steps in protein synthesis, modeling DNA replication and protein synthesis, identifying mutation types.		
Language of Instruction	Nucleotide, base pairing, chromatin, replication, DNA polymerase, messenger RNA, ribosomal RNA, transfer RNA, transcription, RNA polymerase, point mutation, frame shift mutation		
Student Investigations/Student Products			*Writing Your Own Genetic Code* project.
Suggested Laboratory Investigations	*DNA Extraction* *DNA Replication* (Modeling activity) Genetic Decoding *Protein Synthesis* Modeling	*DNA Extraction* with Full Lab Write-Up Dry Lab – *The One-Gene, One-Enzyme Theory* Dry Lab – *Investigating Pneumococcus* Replication Modeling *Lethal Mutations in Yeast Cells*	*DNA Extraction* with Full Lab Write-Up Dry Lab – *The One-Gene, One-Enzyme Theory* Dry Lab – *Investigating Pneumococcus* Replication Modeling *Lethal Mutations in Yeast Cells*
Other Resources	TAKS Tune-up book		
Textbook Correlation	Prentice Hall Chapter 12		BSCS *Molecules to Man* Ch 9 and 12
In-depth Study/Research Opportunity		*"The Cancer Killer"* article, Newsweek	*"The Cancer Killer"* article, Newsweek
Challenge/Extension			

Biology I - Semester II Unit IX

Components	Biology I	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Mendelian Genetics		
Short Descriptive Overview	Students will summarize Mendel's Principles of Inheritance, apply the laws of probability to the science of genetics, and relate the events in meiosis to patterns of inheritance.		
TEKS	(2) Scientific processes. The student uses scientific methods during field and laboratory investigations. The student is expected to: (D) communicate valid conclusions (3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (F) research and describe the history of biology and contributions of scientists (6) Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to: (D) compare genetic variations observed in plants and animals; (E) compare the processes of mitosis and meiosis and their significance to sexual and asexual reproduction;		
TAKS Connections	Objective 1: The student will demonstrate an understanding of the nature of science. Objective 2: The student will demonstrate an understanding of the organization of living systems.		
Generalizations/Enduring Understandings	Inheritance of traits follows the fundamental principles proposed by Mendel and the mathematical laws of probability can be applied to predict the appearance of these traits.		
Guiding/Essential Questions	What is the principle of dominance?		

	What happens during segregation? How do geneticists use the principles of probability? How do geneticists use Punnett squares? What happens during the process of meiosis? What structures actually assort independently?		
Concepts	Mendel's principles Probability Punnett Square analysis Simple Patterns of Inheritance Meiosis Dihybrid and monohybrid crosses	Gene linkage and crossing over	Gene linkage and crossing over
Topics	Mendelian principles, laws of probability, and events in meiosis govern inheritance of traits.		
Essential Facts	The principle of dominance states that some alleles are dominant and others are recessive. The principle of segregation states that each trait is governed by two alleles. The principles of probability can be used to predict the outcomes of genetic crosses. Punnett squares can be used to display these outcomes. The principle of independent assortment states that genes for different traits segregate independently. Some alleles are neither dominant nor recessive, and many traits are controlled by multiple alleles/genes. Meiosis is a process in which chromosome number is reduced in the formation of gametes.		
Processes and Skills	Gathering and interpreting data, analyzing Punnett squares, predicting phenotypic outcomes, applying an understanding of meiosis to Mendelian genetics.		
Language of Instruction	Genetics, allele, genotype, phenotype, homozygous, heterozygous, segregation, independent assortment, trait, hybrid, gene, gamete, true-breeding, meiosis, crossing-over, tetrad		

Student Investigations/Student Products		*Genetics of Tribbles* problem set	*Genetics of Tribbles* problem set
Suggested Laboratory Investigations	*Genetic Corn Analysis* (monohybrid) *Probability* (activity with coins or M&M's) Meiosis Simulation	*Genetic Corn Analysis* (dihybrid and mono)	*Genetic Corn Analysis* (dihybrid and mono)
Other Resources	TAKS Tune-up book		
Textbook Correlation	Prentice Hall Chapter 11, sections 1-5		BSCS *Molecules to Man* Ch. 13 & 14
In-depth Study/Research Opportunity			
Challenge/Extension			

Biology I - Semester II Unit Xa

Components	Biology 1	Biology I Pre AP Extensions	Biology 1 Pre AP TaG Extensions
Unit Name	Human Genetics		
Short Descriptive Overview	Students will learn to analyze human karyotypes and explain how sex is determined. Students will analyze pedigrees of human genetic diseases and describe patterns of inheritance including sex linkage and autosomal traits.		
TEKS	(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (C) evaluate the impact of research on scientific thought, society, and the environment; (D) describe the connection between biology and future careers; F) research and describe the history of biology and contributions of scientists (6) Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to: (A) describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA; (D) compare genetic variations observed in plants and animals; F) identify and analyze karyotypes		
TAKS Connections	Objective 2: The student will demonstrate an understanding of the organization of living systems		
Generalizations/Enduring Understandings	The various inheritance patterns of human traits can be analyzed using pedigrees. Karyotype analysis is useful in diagnosing many human genetic diseases.		
Guiding/Essential Questions	How is sex determined? How do small changes in DNA cause	How do you distinguish between monosomy and trisomy in human	How do you distinguish between monosomy and trisomy in human

	genetic disorders? Why are sex linked disorders more common in males than in females? What is non-disjunction and what problems does it cause?	karyotypes? How are four patterns of inheritance displayed differently in human pedigrees – (sex-linked dominant, sex-linked recessive, autosomal recessive, autosomal dominant)? How are sex-influenced traits different from sex-linked traits? How does the environment influence phenotypes?	karyotypes? How are four patterns of inheritance displayed differently in human pedigrees – (sex-linked dominant, sex-linked recessive, autosomal recessive, autosomal dominant)? How are sex-influenced traits different from sex-linked traits? How does the environment influence phenotypes?
Concepts	Advanced patterns of inheritance Pedigree analysis Karyotypes Human chromosomal disorders		
Topics	Karyotypes and pedigrees can be used to describe and predict human genetic disorders.		
Essential Facts	All human eggs carry a single X chromosome and sperm carry either an X or a Y. If non-disjunction occurs, odd numbers of chromosomes may find their way into gametes and human disorder results. Both cystic fibrosis and sickle-cell disease are the result of point mutations that are recessive.		
Processes and Skills	Gathering and interpreting data, analyzing karyotypes and pedigrees, manipulating models of DNA, determining probability of human genetic disorders in families.		
Language of Instruction	karyotype, sex chromosome, autosome, pedigree, sex linked gene, nondisjunction,	Monosomy, trisomy, consanguineous breeding,	Monosomy, trisomy, consanguineous breeding,
Student Investigations/Student Products	Human Genetic Pamphlet Project	Human Genetic Pamphlet Project	Human Genetic Pamphlet Project (multiple product choices)
Suggested Laboratory Investigations	Exploring Hereditary Traits Pedigree Analysis (Blue People) Karyotyping Lab Effects of Sex-Linked Traits The Blue People	Heredity or Environment – Albino Corn Lab Computer Simulation of Karyotyping	Heredity or Environment – Albino Corn Lab Computer Simulation of Karyotyping Genetic Counseling Simulated Blood Typing Human Genetic Traits Class Activity
Other Resources	TAKS Tune-up book	Lorenzo's Oil -DVD	Lorenzo's Oil -DVD
Textbook Correlation	Chapter 13 and 14		BSCS Chapter 15
In-depth Study/Research		Your Family Pedigree (tongue rolling)	Your Family Pedigree (they choose)

Opportunity		Viewing of Lorenzo's Oil, Research the progress of family and recent developments in ALD treatment.	Viewing of Lorenzo's Oil, Research the progress of family and recent developments in ALD treatment.
Challenge/Extension			"Fragile X" Dallas Life Magazine

Biology I - Semester II Unit Xb

Components	Biology 1	Biology I Pre AP Extensions	Biology 1 Pre AP TaG Extensions
Unit Name		Advances in Molecular Genetics	Advances in Molecular Genetics
Short Descriptive Overview		Students will explain how scientists manipulate DNA and describe the usefulness of genetic engineering applications.	Students will explain how scientists manipulate DNA and describe the usefulness of genetic engineering applications.
TEKS		(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (C) evaluate the impact of research on scientific thought, society, and the environment; (D) describe the connection between biology and future careers; F) research and describe the history of biology and contributions of scientists (6) Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to: (A) describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA.	(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (C) evaluate the impact of research on scientific thought, society, and the environment; (D) describe the connection between biology and future careers; F) research and describe the history of biology and contributions of scientists (6) Science concepts. The student knows the structures and functions of nucleic acids in the mechanisms of genetics. The student is expected to: (A) describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA.
TAKS Connections		Objective 2: The student will demonstrate an understanding of the organization of living systems.	Objective 2: The student will demonstrate an understanding of the organization of living systems.
Generalizations/Enduring Understandings		The universal structure of DNA allows scientists to manipulate genes between organisms.	The universal structure of DNA allows scientists to manipulate genes between organisms.
Guiding/Essential Questions		How do scientists make changes to DNA? How are transgenic organisms useful to human beings? What is the goal of the human genome project? What is gene therapy?	How do scientists make changes to DNA? How are transgenic organisms useful to human beings? What is the goal of the human genome project? What is gene therapy?
Concepts		Genetic engineering Human genome project Gene therapy	Genetic engineering Human genome project Gene therapy

Topics		New genetic engineering techniques have improved agriculture, provided therapy for disease, and promise to improve our understanding of human genetic disorders.	New genetic engineering techniques have improved agriculture, provided therapy for disease, and promise to improve our understanding of human genetic disorders.
Essential Facts		Scientists use their knowledge of DNA structure to extract DNA from cells, identify sequences, and transfer genes to other cells. Genetic engineering has spurred the growth of biotechnology and is changing the way we interact with the living world. Describe how researchers are attempting to cure genetic disorders. The human genome project is an on-going effort to analyze human DNA sequences. In gene therapy, an absent or faulty gene is replaced by a normal working gene.	Scientists use their knowledge of DNA structure to extract DNA from cells, identify sequences, and transfer genes to other cells. Genetic engineering has spurred the growth of biotechnology and is changing the way we interact with the living world. Describe how researchers are attempting to cure genetic disorders. The human genome project is an on-going effort to analyze human DNA sequences. In gene therapy, an absent or faulty gene is replaced by a normal working gene.
Processes and Skills		Gathering and interpreting data, analyzing karyotypes and pedigrees, manipulating models of DNA, determining probability of human genetic disorders in families, describing how researchers are attempting to cure genetic disorders.	Gathering and interpreting data, analyzing karyotypes and pedigrees, manipulating models of DNA, determining probability of human genetic disorders in families, describing how researchers are attempting to cure genetic disorders.
Language of Instruction		Genetic engineering, restriction enzyme, gel electrophoresis, recombinant DNA, plasmid, transgenic, clone, DNA fingerprint, Vector, restriction fragment length polymorphism analysis, Southern blot, interferons, interleukins	Genetic engineering, restriction enzyme, gel electrophoresis, recombinant DNA, plasmid, transgenic, clone, DNA fingerprint, Vector, restriction fragment length polymorphism analysis, Southern blot, interferons, interleukins, bioethics
Student Investigations/Student Products			*Genetic Clairvoyance – "What if the Medical Choice was Yours to Make?"* article
Suggested Laboratory Investigations		*Gel Electrophoresis* *DNA Fingerprinting* On-line Activity *DNA Restriction Analysis* *Probing for Prints* (RFLP) Activities	*Gel Electrophoresis* *DNA Fingerprinting* On-line Activity *DNA Restriction Analysis* *Probing for Prints* (RFLP) Activities
Other Resources			
Textbook Correlation		Prentice Hall Chapters 13 and 14	BSCS *Molecules to Man* Chapter 15
In-depth Study/Research Opportunity			Case Studies in Ethics *"Into the Gene Pool"* Newsweek Dec. – Jan. 1999
Challenge/Extension			Biotechnology Research Project

Biology I - Semester II Unit XI

Components	Biology 1	Biology I Pre AP Extensions	Biology I Pre AP TaG Extensions
Unit Name	Microbiology and Disease		
Short Descriptive Overview	Students will recognize the differences between viruses and prokaryotic cells, and understand the relationship of viruses and bacteria to human disease. Human Disease and Immune Response, Lab techniques		
TEKS	(1) Scientific processes. The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to: (A) demonstrate safe practices during field and laboratory investigations; (3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (C) evaluate the impact of research on scientific thought, society, and the environment; (D) describe the connection between biology and future careers; F) research and describe the history of biology and contributions of scientists. (7) Science concepts. The student knows the theory of biological evolution. The student is expected to: (A) identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology; (11) Science concepts. The student knows that organisms maintain homeostasis. The student is expected to (D) summarize the role of microorganisms in maintaining and disrupting equilibrium including diseases in plants and animals and decay in an ecosystem.		

TAKS Connections	Objective 1: The student will demonstrate an understanding of the nature of science. Objective 2: The student will demonstrate an understanding of the organization of living systems Objective 3: The student will demonstrate an understanding of the interdependence of organisms and the environment.		
Generalizations/Enduring Understandings	Viruses are not alive and are important agents of human disease. Bacteria can be free-living and the vast majority are beneficial.		
Guiding/Essential Questions	How do the two groups of prokaryotes differ? What factors are used to identify prokaryotes? What is the importance of bacteria? What is the structure of a virus? How do viruses cause infection? How do bacteria cause disease? How can bacterial growth be controlled? How do viruses cause disease?		
Concepts	Classifying Prokaryotes Identifying prokaryotes Metabolic diversity among prokaryotes Growth and reproduction in bacteria Importance of bacteria Viral structure Viral infection Retroviruses Bacterial disease in humans Controlling bacteria Viral disease in humans	Viroids and prions Human Immune Response Types of white blood cells Types of immunity (active and passive) Vaccinations	Viroids and prions Human Immune Response Types of white blood cells Types of immunity (active and passive) Vaccinations
Topics	Prokaryotes are classified and identified by shape, colony formation, and cell wall construction. Bacteria inhabit diverse environments and have developed unique modes of obtaining energy. Humans directly benefit from relationships with bacteria. Viruses do not have all the characteristics of life, yet impact living things in a variety of ways. Both viruses and bacteria can be agents of disease. Humans have developed varied methods of controlling the methods of reproduction of viruses and bacteria.		

Essential Facts	Eubacteria have cell walls made up of peptidoglycan, whereas archaebacteria do not contain peptidoglycan. Prokaryotes are identified by their shapes, the chemical nature of their cell walls, the ways they move, and the way they obtain energy. Some bacteria are producers that capture energy by photosynthesis. Others break down nutrients in the atmosphere. Still other bacteria have other human uses. Bacteria Some bacteria damage their hosts by producing toxins. The various methods to control bacterial growth include sterilizations, disinfectants, and food processing. A typical virus is composed of DNA or RNA surrounded by a protein coat. In a lytic infection, a virus enters a cell, replicates, and causes a cell to burst. In the lysogenic infection, a virus integrates it's DNA into the host's DNA and doesn't cause immediate destruction.		
Processes and Skills	Interpreting viral life cycle diagrams, naming bacteria based on diagrams, explaining symbiotic relationships between bacteria and other organisms, identifying important agents of human disease, explaining the life cycle of a retrovirus such as HIV.		
Language of Instruction	Prokaryote, bacillus, coccus, spirillum, aerobe, binary fission, pathogen, vaccine, antibiotic, capsid, core, cell wall, sterilization, disinfectant, bacteriophage, lytic infection, lysogenic infection, retrovirus	Nitrogen fixation, obligate aerobe, obligate anaerobe, facultative anaerobe, endospores, Gram +, Gram -, viroid, prion, prophage, provirus	Nitrogen fixation, obligate aerobe, obligate anaerobe, facultative anaerobe, endospores, Gram +, Gram -, viroid, prion, prophage, provirus
Student Investigations/Student Products			Virus Models Project
Suggested Laboratory Investigations	*Collecting Mold and Bacteria* *Microorganism Food Spoilage* *Virus Replication* (model using factory take-over) *Tracking a Plague* Activity *Black Death* Lab (disease transmission simulation)	*Distribution of Microbes* (sampling microbes in areas of the school) *Black Death* Lab (disease transmission simulation) *Fungus Among Us!* (growth of mold on breads of different types) *Inhibiting Mold Growth* (modeling use of food preservatives)	*Distribution of Microbes* (sampling microbes in areas of the school) *Black Death* Lab (disease transmission simulation) *Fungus Among Us!* (growth of mold on breads of different types) *Inhibiting Mold Growth* (modeling use of food preservatives)

		Observing Bacteria Shape	*Observing Bacteria Shape*
Other Resources	*"Hot Zone"* Reading excerpt *The Plague Fighters* Video *"The Bugs Within Us"* article	*"Guess What's Coming to Dinner"* article *"Losing the battle of the Bug"* article	"Guess What's Coming to Dinner" article "Losing the battle of the Bug" article
Textbook Correlation	Prentice Hall Chapter 19		BSCS *Molecules to Man* Chapter 6. 3 & 17.5
In-depth Study/Research Opportunity			*"Killer Virus – Beyond the Ebola Scare"* article, Newsweek, May22, 1995 *The Hot Zone*
Challenge/Extension			Investigating Anti-bacterial Products in your life