

Smyth County Schools Curriculum Map



Grade:10

Subject: Biology

	1st Quarter	2nd Quarter
Standards	<p>1st 4.5 Weeks (Block Schedule)</p> <p>BIO.1 The student will plan and conduct investigations in which</p> <p>a) observations of living organisms are recorded in the lab and in the field;</p> <p>c) variables are defined and investigations are designed to test hypotheses;</p> <p>d) graphing and arithmetic calculations are used as tools in data analysis;</p> <p>f) sources of error inherent in experimental design are identified and discussed;</p> <p>g) validity of data is determined;</p> <p>j) research utilizes scientific literature;</p> <p>k) differentiation is made between a scientific hypothesis and theory;</p> <p>l) alternative scientific explanations and models are recognized</p>	<p>2nd 4.5 Weeks (Block Schedule)</p> <p>BIO.1 The student will plan and conduct investigations in which</p> <p>a) observations of living organisms are recorded in the lab and in the field;</p> <p>b) hypotheses are formulated based on direct observations and information from scientific literature;</p> <p>d) graphing and arithmetic calculations are used as tools in data analysis;</p> <p>f) sources of error inherent in experimental design are identified and discussed;</p> <p>g) validity of data is determined;</p> <p>h) chemicals and equipment are used in a safe manner;</p> <p>i) appropriate technology including computers, graphing calculators, and probe ware, is used for gathering and analyzing data and communicating results;</p> <p>j) research utilizes scientific literature.</p> <p>BIO.2 The student will investigate and understand the history of biological concepts. Key concepts include</p> <p>a) evidence supporting the cell theory;</p> <p>e) the collaborative efforts of scientists, past and present.</p> <p>BIO.3 The student will investigate and understand the chemical and biochemical principles essential for life. Key concepts include</p> <p>b) the structure and function of macromolecules;</p> <p>c) the nature of enzymes; and</p> <p>d) the capture, storage, transformation, and flow of energy through the processes of photosynthesis and respiration.</p> <p>BIO.4 The student will investigate and understand relationships</p>

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<p>and analyzed; and</p> <p>m) a scientific viewpoint is constructed and defended (the nature of science).</p> <p>BIO.3 The student will investigate and understand the chemical and biochemical principles essential for</p> <p>life. Key concepts include</p> <p>a) water chemistry and its impact on life processes.</p> <p>BIO.4 The student will investigate and understand relationships between cell structure and function. Key</p> <p>concepts include</p> <p>a) characteristics of prokaryotic and eukaryotic cells.</p> <p>BIO.5 The student will investigate and understand life functions of archaeobacteria, monerans</p>	<p>between cell structure and function. Key concepts include</p> <p>a) characteristics of prokaryotic and eukaryotic cells;</p> <p>b) exploring the diversity and variation of eukaryotes;</p> <p>c) similarities between the activities of a single cell and a whole organism; and</p> <p>d) the cell membrane model (diffusion, osmosis, and active transport).</p> <p>BIO.5 The student will investigate and understand life functions of archaeobacteria, monerans (eubacteria), protists, fungi, plants, and animals including humans. Key concepts include</p> <p>d) maintenance of homeostasis.</p> <p>BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include</p> <p>a) cell growth and division;</p> <p>c) cell specialization;</p> <p>f) the structure, function, and replication of nucleic acids (DNA and RNA).</p>
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(eubacteria), protists, fungi, plants, and animals including humans. Key concepts include

c) analyses of their responses to the environment;

d) maintenance of homeostasis.

BIO.6 The student will investigate and understand common mechanisms of inheritance and protein

synthesis. Key concepts include

f) the structure, function, and replication of nucleic acids (DNA and RNA);

g) events involved in the construction of proteins.

BIO.8 The student will investigate and understand how populations change through time. Key concepts

include

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	<p>b) how genetic variation, reproductive strategies, and environmental pressures impact the survival of populations.</p> <p>BIO.9 The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include</p> <p>a) interactions within and among populations including carrying capacities, limiting factors, and growth curves;</p> <p>c) succession patterns in ecosystems;</p> <p>d) the effects of natural events and human activities on ecosystems.</p>	
Content	<p>Unit I- What is Biology</p> <p>Unit II-Principles of Ecology</p> <p>Chapters 1-5</p>	<p>Unit III-The life of a Cell</p> <p>Chapters 6-9</p>

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Skills	<p>Unit I- What is Biology</p> <p>Unit II-Principles of Ecology</p> <p>Chapters 1-5</p> <ul style="list-style-type: none"> -Recognize possible benefits from studying Biology -Characteristics of living things -Compare Scientific Method -Differentiate among hypothesis,theory,and principle -Compare and contrast quantitative and qualitative data -Identify why science and technology cannot solve all problems -Ethical issues in science -Apply safety rules and symbols 	<p>Unit III-The life of a Cell</p> <p>Chapters 6-9</p> <ul style="list-style-type: none"> -Elements found in living things -Figure protons, electrons, and neutrons -Trace elements -Covalent and Ionic Bonds -Distinguish between mixtures and solutions -Acids and bases and their importance to living things -Energy levels for elements -Writing Chemical equations -Properties of water -Process of diffusion -Scientist important in the field of Biology -Organic compounds in living things-Carbohydrates, Proteins, Lipids and Nucleic Acids -Advances in microscope technology -Compound microscope and electron microscopes -Cell theory -Prokaryotic cell and eukaryotic cells -Cell organelles and functions -Structure of the plasma membrane -Why cells must maintain homeostasis -Plant cell and animal cells -Function of plasma membrane -Fluid mosaic model -Passive transport-Osmosis, diffusion and transport proteins -Hypertonic, hypotonic and isotonic conditions -Active transport-endocytosis and exocytosis -Plasmolysis and turgor pressure -Cell division -Cell growth and reproduction -Cell cycle-Interphase, prophase, metaphase, anaphase, telophase -Cells, tissues, organs, organ systems, organism
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	<ul style="list-style-type: none"> -Distinguish between abiotic and biotic factors -Compare the different levels of biological organization -What factors determine habitat and niche -Homeostasis -Compare how organisms satisfy their nutritional needs -Trace the pathway of energy and matter in an ecosystem -Carbon, Water, and Nitrogen Cycle -Food Chains and Food webs -Limiting factors -Range of tolerance for a particular organism -Sequence the stages of ecological succession -Compare primary and secondary succession 	<ul style="list-style-type: none"> -Importance of enzymes in living things -Cancer -Identify potential ways to reduce the risk of cancer -Structure of a chromosome -Why organisms need energy -How organisms store energy-ATP -Structure of chloroplast -Photosynthesis: <ul style="list-style-type: none"> Light dependent reactions Dark phase or Calvin cycle -Cellular respiration: <ul style="list-style-type: none"> Glycolysis and Citric Acid Cycle
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- Parts and functions of a microscope
- Distinguish between aquatic and terrestrial ecosystems
- Compare and contrast photic and aphotic zones
- Identify the major limiting factors that determine
terrestrial biomes
- Compare and contrast linear and exponential growth
patterns.
- Reproductive patterns of organisms
- Density dependent and density independent factors
on a population
- Human population growth patterns
- Carrying capacity of a population

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	<ul style="list-style-type: none"> -Factors that affect population growth curves -Three proportions of the age structure -Importance of Biodiversity -Major threats to biodiversity -Strategies used in conservation efforts -Protecting endangered and threatened species 	
Assessment	<ul style="list-style-type: none"> Directed reading worksheets -Reinforcement worksheets -Vocabulary quiz 	<ul style="list-style-type: none"> -Directed reading worksheets -Reinforcement worksheets -Vocabulary quiz -Lab activities -Chapter test -Drawings

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	<ul style="list-style-type: none"> -In class activities/hands on labs -Science Projects -Chapter test 	
<p>Related Literature</p>	<ul style="list-style-type: none"> -Current events in newspapers and internet -SOL blueprint -Cross curriculum readings and class discussions -Biology Reading Essential 	<ul style="list-style-type: none"> Current events in newspapers and internet -SOL blueprint -Cross curriculum readings
<p>Technology</p>	<ul style="list-style-type: none"> -Calculators -Video quiz -Videos -PowerPoint -pH Pen -Probeware _Graphing Calculator 	<ul style="list-style-type: none"> -Glencoe textbook website: http://www.bdol.glencoe.com -Video quiz -Riverdeep

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	3rd Quarter	4 th Quarter
<p>Standards</p>	<p>3rd 4.5 Weeks (Block Schedule)</p> <p>BIO.1 The student will plan and conduct investigations in which</p> <p>a) observations of living organisms are recorded in the lab and in the field;</p> <p>b) hypotheses are formulated based on direct observations and information from scientific literature;</p> <p>e) conclusions are formed based on recorded quantitative and qualitative data;</p> <p>g) validity of data is determined;</p> <p>l) alternative scientific explanations and models are recognized and analyzed; and</p> <p>m) a scientific viewpoint is constructed and defended (the nature of science).</p> <p>BIO.2 The student will investigate and understand the history of</p>	<p>4th 4.5 Weeks (Block Schedule)</p> <p>BIO.1 The student will plan and conduct investigations in which</p> <p>a) observations of living organisms are recorded in the lab and in the field;</p> <p>b) hypotheses are formulated based on direct observations and information from scientific literature;</p> <p>c) variables are defined and investigations are designed to test hypotheses;</p> <p>h) chemicals and equipment are used in a safe manner; gathering and analyzing data and communicating results;</p> <p>j) research utilizes scientific literature</p> <p>BIO.4 The student will investigate and understand relationships between cell structure and function. Key concepts include</p> <p>a) characteristics of prokaryotic and eukaryotic cells</p> <p>BIO.5 The student will investigate and understand life functions of archaeobacteria, monerans (eubacteria), protists, fungi, plants, and animals including humans. Key concepts include</p> <p>b) comparison of their metabolic activities;</p> <p>f) how viruses compare with organisms.</p> <p>BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include</p> <p>h) use, limitations, and misuse of genetic information; and</p> <p>i) exploration of the impact of DNA technologies.</p> <p>BIO.7 The student will investigate and understand bases for modern classification systems. Key</p>

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<p>biological concepts. Key concepts include</p> <p>b) scientific explanations of the development of organisms through time (biological evolution);</p> <p>c) evidence supporting the germ theory of infectious disease;</p> <p>d) development of the structural model of DNA; and</p> <p>e) the collaborative efforts of scientists, past and present.</p> <p>BIO.3 The student will investigate and understand the chemical and biochemical principles essential for life. Key concepts include</p> <p>c) the nature of enzymes</p> <p>BIO.4 The student will investigate and understand relationships</p>	<p>concepts include</p> <p>b) fossil record interpretation;</p> <p>c) comparison of developmental stages in different organisms;</p> <p>d) examination of biochemical similarities and differences among organisms; and</p> <p>e) systems of classification that are adaptable to new scientific discoveries.</p>
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	<p>between cell structure and function. Key concepts include</p> <ul style="list-style-type: none">a) characteristics of prokaryotic and eukaryotic cells;b) exploring the diversity and variation of eukaryotes. <p>BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include</p> <ul style="list-style-type: none">c) cell specialization;d) prediction of inheritance of traits based on the Mendelian laws of heredity;h) use, limitations, and misuse of genetic information; andi) exploration of the impact of DNA technologies.	
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	<p>BIO.7 The student will investigate and understand bases for modern classification systems. Key concepts include</p> <ul style="list-style-type: none">a) structural similarities among organisms;b) fossil record interpretation;d) examination of biochemical similarities and differences among organisms. <p>BIO.8 The student will investigate and understand how populations change through time. Key concepts include</p> <ul style="list-style-type: none">a) evidence found in fossil records;c) how natural selection leads to adaptations;d) emergence of new species.	
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Content	Unit 4-Genetics Chapters 10-13	Unit 4-Genetics Chapters 10-13
Skills	Unit 4-Genetics Chapters 10-13 -Punnett Squares -Monohybrid Cross -Dihybrid cross -Homozygous and heterozygous -Meiosis-formation of sex cells -Crossing over and nondisjunction -Mistakes in meiosis	Identify types of fossils -Geological time scale -Concept of biogenesis -Review, analyze and critique modern theories of life -Origin of the first cell -Spontaneous Generation -Darwin's theory of natural selection -Structural and physiological adaptations of organisms -Natural selection on gene pools -History, purpose, and methods of taxonomy -Scientific names-Binominal nomenclature -Classification system -Evolutionary relationships -Interpret a phylogenetic tree or a cladogram -Relationships based on homologous structures -Six kingdoms -Dichotomous key -Viruses and their structures -Replication cycles of viruses-lytic and lysogenic -Characteristics of bacteria -Economic importance of bacteria -Prokaryotic cells-archaebacteria and eubacteria -Human anatomy -Urinary System -Circulatory System -Human Health Issues -Frog Dissection, Parts and Functions

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	<ul style="list-style-type: none">-DNA structure-Replication of DNA-RNA structure-Transcription DNA to RNA-Translation-Reading amino acids-Mutations-Deletions, Insertions, Inversions, and translocation-Extraction of DNA-Double Helix Structure (Watson and Crick)-Interpret a pedigree-Human genetic disorders, dominant and recessive-Read a human karyotype	
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	<ul style="list-style-type: none">-Incomplete and codominance-Multiple and polygenetic inheritance patterns-Hemophilia and red-green colorblindness-Analyze sex-linked traits-Internal and external factors that affect gene expression-Blood types-Testcross-Evaluate the importance of plant and animal breeding-Genetic engineering of plants and animals-Applications of genetic engineering-Applications of the Human Genome Project	
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<p>Assessment</p>	<p>Reading Worksheets</p> <p>-Vocabulary Quiz</p> <p>-Punnett Square Problem Sheet</p> <p>-Chapter Test</p> <p>-Karyotype</p> <p>-Lab Worksheets</p> <p>-Flanagan Mott Test</p> <p>-Released SOL Tests</p>	<p>Reading Worksheets</p> <p>-Vocabulary Quiz</p> <p>-Chapter Test</p> <p>-Video quiz</p> <p>-Lab Worksheets</p>
<p>Related Literature</p>	<p>Current events in newspapers and internet</p> <p>-SOL blueprint</p> <p>-Cross curriculum readings and class discussions</p>	<p>Current Events in newspaper and Internet</p> <p>-SOL Blueprint</p> <p>-Cross-curriculum readings</p>
<p>Technology</p>	<p>Video</p> <p>-United Streaming</p>	<p>-United Streaming</p> <p>-Videos</p>