

Pre AP Biology Curriculum Guide

1st Nine Weeks

<p>Strand: Nature of Science Concept: Scientific Processes Resource: Biology, Chapter 1 10 Days</p>	<p>NS.10.B.1 Explain why science is limited to natural explanations of how the world works</p> <p>NS.10.B.2 Compare and contrast hypotheses, theories, and laws</p> <p>NS.10.B.3 Distinguish between a scientific theory and the term “theory” used in general conversation</p> <p>NS.10.B.4 Summarize the guidelines of science:</p> <ul style="list-style-type: none">➤ explanations are based on observations, evidence, and testing➤ hypotheses must be testable➤ understandings and/or conclusions may change with additional empirical data➤ scientific knowledge must have peer review and verification before acceptance <p>NS.11.B.1 Develop and explain the appropriate procedure, controls, and variables (dependent and independent) in scientific experimentation</p> <p>NS.11.B.2 Research and apply appropriate safety precautions (refer to ADE Guidelines) when designing and/or conducting scientific investigations</p> <p>NS.11.B.3 Identify sources of bias that could affect experimental outcome</p> <p>NS.11.B.4 Gather and analyze data using appropriate summary statistics</p> <p>NS.11.B.5 Formulate valid conclusions without bias</p> <p>NS.11.B.6 Communicate experimental results using appropriate reports, figures, and tables</p> <p>NS.12.B.1 Recognize that theories are scientific explanations that require empirical data, verification, and peer review</p> <p>NS.12.B.2 Understand that scientific theories may be modified or expanded based on additional empirical data, verification, and peer review</p> <p>NS.13.B.1 Collect and analyze scientific data using appropriate mathematical calculations, figures, and tables</p> <p>NS.13.B.2 Use appropriate equipment and technology as tools for solving problems (e.g., microscopes, centrifuges, flexible arm cameras, computer software and hardware)</p> <p>NS.13.B.3 Utilize technology to communicate research findings</p> <p>NS.14.B.1 Compare and contrast biological concepts in pure science and applied science</p> <p>NS.14.B.2 Discuss why scientists should work within ethical parameters</p> <p>NS.14.B.4 Explain how the cyclical relationship between science and technology results</p>
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	<p>in reciprocal advancements in science and technology MC.2.B.1 Construct a hierarchy of life from cells to ecosystems MC.2.B.11 Discuss homeostasis using thermoregulation as an example (Chapter 20, Section 13 Chapter 25, Section 2) NS.12.B.7 Research current events and topics in biology (can be done anytime and repeated throughout year)</p> <p>MCO: Laboratories are to be conducted in groups to develop socialization skills of students as well as demonstrate the nature of science</p>
<p>Strand: Molecules and Cells Concept: Structure and Properties (Function) of Living Systems Resource: Biology, Chapter 2 Sections 9-17 Chapter 3 6 Days</p>	<p>MC.1.B.3 Investigate the properties and importance of water and its significance for life:</p> <ul style="list-style-type: none"> ➤ surface tension ➤ adhesion ➤ cohesion ➤ polarity ➤ pH <p>MC.1.B.1 Describe the structure and function of the major organic molecules found in living systems:</p> <ul style="list-style-type: none"> ➤ carbohydrates ➤ proteins ➤ enzymes ➤ lipids ➤ nucleic acids <p>MCO: Students investigate the health issues when organic molecules are lacking or overly consumed</p>

<p>Strand: Molecules and Cells Concept: Structure and Properties (Function) of Living Systems Resource: Biology, Chapter 5, Sections 1-8 4 Days</p>	<p>MC.1.B.2 Describe the relationship between an enzyme and its substrate molecule(s) MC.1.B.4 Explain the role of energy in chemical reactions of living systems:</p> <ul style="list-style-type: none"> ➤ activation energy ➤ exergonic reactions ➤ endergonic reactions <p>MCO: Students conduct labs in groups on chemical reactions in living systems</p>
<p>Strand: Ecology and Behavioral Relationships Concept: Cycles, Energy, and Relationships within Ecosystems Resource: Biology, Chapters 34 and 37 12 Days</p>	<p>EBR.8.B.1 Cite examples of abiotic and biotic factors of ecosystems EBR.8.B.2 Compare and contrast the characteristics of biomes EBR.8.B.3 Diagram the carbon, nitrogen, phosphate, and water cycles in an ecosystem EBR.8.B.4 Analyze an ecosystem's energy flow through food chains, food webs, and energy pyramids EBR.8.B.5 Identify and predict the factors that control population, including predation, competition, crowding, water, nutrients, and shelter EBR.8.B.6 Summarize the symbiotic ways in which individuals within a community interact with each other:</p> <ul style="list-style-type: none"> ➤ commensalism ➤ parasitism ➤ mutualism <p>EBR.8.B.7 Compare and contrast primary succession with secondary succession EBR.8.B.8 Identify the properties of each of the five levels of ecology:</p> <ul style="list-style-type: none"> ➤ organism ➤ population ➤ community ➤ ecosystem ➤ biosphere

<p>Strand: Molecules and Cells Concept: Structure and Properties (Function) of Living Systems Resource: Biology, Chapter 4 9 Days</p>	<p>MC.2.B.2 Compare and contrast prokaryotes and eukaryotes</p> <p>MD.2.B.3 Describe the role of sub-cellular structures in the life of a cell:</p> <ul style="list-style-type: none">➤ organelles➤ ribosomes➤ cytoskeleton <p>MC.2.B.5 Compare and contrast the structures of an animal cell to a plant cell (MCO)</p>
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Biology Pacing Guide/Scope and Sequence
2nd Nine Weeks

<p>Strand: Molecules and Cells Concept: Structure and Properties (Function) of Living Systems Resource: Biology, Chapter 5 Sections 10-21 4 days</p>	<p>MC.2.B.4 Relate the function of the plasma (cell) membrane to its structure</p> <p>MC.2.B.7 Compare and contrast active transport and passive transport mechanisms:</p> <ul style="list-style-type: none"> ➤ diffusion ➤ osmosis ➤ endocytosis ➤ exocytosis ➤ phagocytosis ➤ pinocytosis
<p>Strand: Molecules and Cells Concept: Structure and Properties (Function) of Living Systems/Energy Interactions within Living Systems Resource: Biology, Chapter 7 and 6 15 Days</p>	<p>MC.3.B.1 Compare and contrast the structure and function of mitochondria and chloroplasts</p> <p>MC.3.B.4 Describe and model the conversion of light energy to chemical energy by photosynthetic organisms:</p> <ul style="list-style-type: none"> ➤ light dependent reactions ➤ light independent reactions <p>MC.3.B.5 Compare and contrast cellular respiration and photosynthesis as energy conversion pathways</p> <p>MC.3.B.2 Describe and model the conversion of stored energy in organic molecules into usable cellular energy (ATP):</p> <ul style="list-style-type: none"> ➤ glycolysis ➤ citric acid cycle ➤ electron transport chain <p>MC.3.B.3 Compare and contrast aerobic and anaerobic respiration:</p> <ul style="list-style-type: none"> ➤ lactic acid fermentation ➤ alcoholic fermentation <p>MC.2.B.6 Compare and contrast the functions of autotrophs and heterotrophs (MCO)</p>

<p>Strand: Molecules and Cells Concept: Reproduction of living systems Resource: Biology, Chapter 8, Sections 1-9 9 days</p>	<p>MC.2.B.8 Describe the main events in the cell cycle, including the differences in plant and animal cell division:</p> <ul style="list-style-type: none"> ➤ interphase ➤ mitosis ➤ cytokinesis <p>MC.2.B.9 List in order and describe the stages of mitosis:</p> <ul style="list-style-type: none"> ➤ prophase ➤ metaphase ➤ anaphase ➤ telophase
<p>Strand: Heredity Concept: Inheritance Within Living Systems Resource: Biology, Chapter 9 10 Days</p>	<p>HE.4.B.1 Summarize the outcomes of Gregor Mendel's experimental procedures</p> <p>HE.4.B.2 Differentiate among the laws and principles of inheritance:</p> <ul style="list-style-type: none"> ➤ dominance ➤ segregation ➤ independent assortment <p>HE.4.B.3 Use the laws of probability and Punnett squares to predict genotypic and phenotypic ratios</p> <p>HE.4.B.4 Examine different modes of inheritance:</p> <ul style="list-style-type: none"> ➤ codominance ➤ crossing over ➤ incomplete dominance ➤ multiple alleles <p>MC.2.B.10 Analyze the meiotic maintenance of a constant chromosome number from one generation to the next (Chapter 8, Sections 12-18) (MCO)</p>

Biology Pacing Guide/Scope and Sequence
3rd Nine Weeks

<p>Strand: Heredity Concept: History of Science/Cell Theory Resource: Biology, Chapter 10, Sections 1-16 10 days</p>	<p>HE.4.B.5 Analyze the historically significant work of prominent geneticists HE.5.B.1 Model the components of a DNA nucleotide and an RNA nucleotide HE5.B.2 Describe the Watson-Crick double helix model of DNA, using the base-pairing rule (adenine-thymine, cytosine-guanine) HE.5.B.3 Compare and contrast the structure and function of DNA and RNA HE.5.B.4 Describe and model the processes of replication, transcription, and translation HE.5.B.5 Compare and contrast the different types of mutation events, including point mutation, frameshift mutation, deletion, and inversion HE.5.B.6 Identify effects of changes brought about by mutations: <ul style="list-style-type: none"> ➤ beneficial ➤ harmful ➤ neutral </p>
<p>Chapters 11 and 12 2 Days</p>	<p>NS.12.B.4 Relate the development of the cell theory to current trends in cellular biology NS.12.6 Relate the chromosome theory of heredity to recent findings in genetic research (e.g., Human Genome Project-HGP, chromosome therapy) HE.4.B.4 Examine different modes of inheritance: <ul style="list-style-type: none"> ➤ sex linkage (Chapter 9, Section 22-24) </p>
<p>Chapter 8, Sections 19 & 20 3 Days</p>	<p>HE.4.B.6 Evaluate karyotypes for abnormalities: (MCO) <ul style="list-style-type: none"> ➤ monosomy ➤ trisomy </p>

<p>Strand: Heredity Concept: Processes of Change Over Time Resource: Biology, Chapter 13,14 Chapter 15, Section 1-5 12 Days</p>	<p>HE.6.B.1 Compare and contrast Lamarck’s explanation of evolution with Darwin’s theory of evolution by natural selection</p> <p>HE.6.B.2 Recognize that evolution involves a change in allele frequencies in a population across successive generations</p> <p>HE.6.B.3 Analyze the effects of mutations and the resulting variations within a population in terms of natural selection</p> <p>HE.6.B.4 Illustrate mass extinction events using a time line</p> <p>HE.6.B.5 Evaluate evolution in terms of evidence as found in the following:</p> <ul style="list-style-type: none"> ➤ fossil record ➤ DNA analysis ➤ artificial selection ➤ morphology ➤ embryology ➤ viral evolution ➤ geographic distribution of related species ➤ antibiotic and pesticide resistance in various organisms <p>HE.6.B.6 Compare the processes of relative dating and radioactive dating to determine the age of fossils</p> <p>NS.12.B.3 Summarize biological evolution</p> <p>MCO: Examine the development of theories and the relationship of evidence to the development</p>
<p>Strand: Heredity/Classification and the Diversity of Life Concept: Diversity Within and Among Living Systems Resource: Biology, Chapter 15, Sections 6-10 Chapter 1, Section 5 10 Days</p>	<p>HE.6.B.7 Interpret a Cladogram</p> <p>CDL.7.B.1 Differentiate among the different domains:</p> <ul style="list-style-type: none"> ➤ Bacteria ➤ Archaea ➤ Eukarya <p>CDL.7.B.2 Differentiate the characteristics of the six kingdoms:</p> <ul style="list-style-type: none"> ➤ Eubacteria ➤ Archaea ➤ Protista ➤ Fungi ➤ Plantae ➤ Animalia

	<p>CDL.7.B.3 Identify the seven major taxonomic categories:</p> <ul style="list-style-type: none">➤ kingdom➤ phylum➤ class➤ order➤ family➤ genus➤ species <p>CDL.7.B.4 Classify and name organisms based on their similarities and differences applying taxonomic nomenclature using dichotomous keys (Must use supplements) (MCO)</p> <p>CDL.7.B.5 Investigate Arkansas' biodiversity using appropriate tools and technology (MCO)</p>
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Biology Pacing Guide/Scope and Sequence

4th Nine Weeks

<p>Strand: Classification and the Diversity of Life Concept: Structure and Function/Diversity Within Living Systems Resource: Biology, Chapter 10, Sections 17-23 2 Days</p> <p>Chapter 16, Sections 7-16 3 Days</p> <p>Chapter 16, Sections 18-25 5 days</p>	<p>CDL.7.B.6 Compare and contrast the structures and characteristics of viruses (lytic and lysogenic cycles) with non-living and living things</p> <p>CDL.7.B.7 Evaluate the medical and economic importance of viruses (MCO)</p> <p>CDL.7.B.8 Compare and contrast life cycles of familiar organisms</p> <ul style="list-style-type: none"> ➤ sexual reproduction ➤ asexual reproduction <p>CDL.7.B.9 Classify bacteria according to their characteristics and adaptations</p> <p>CDL.7.B.10 Evaluate the medical and economic importance of bacteria (MCO)</p> <p>NS.12.B.5 Describe the relationship between the germ theory of disease and our current knowledge of immunology and control of infectious diseases (Reference Chapter 24) (MCO)</p> <p>CDL.7.B.11 Describe the characteristics used to classify protists:</p> <ul style="list-style-type: none"> ➤ plant-like ➤ animal-like ➤ fungal-like <p>CDL.7.B.12 Evaluate the medical and economic importance of protists</p> <p>CDL.7.B.8 Compare and contrast life cycles of familiar organisms</p> <ul style="list-style-type: none"> ➤ sexual reproduction ➤ asexual reproduction ➤ alternation of generations
<p>Strand: Classification and the Diversity of Life Concept: Structure and Function/Cycles Resource: Biology, Chapter 17, Sections 15-22 2 days</p>	<p>CDL.7.B.13 Compare and contrast fungi with other eukaryotic organisms</p> <p>CDL.7.B.14 Evaluate the medical and economic importance of fungi (MCO)</p>

<p>Strand: Classification and the Diversity of Life Concept: Structure and Function/ Cycles Resource: Biology, Chapter 17, Sections 1-14 Chapter 31 and 32 10 Days</p>	<p>CDL.7.B.15 Differentiate between vascular and nonvascular plants</p> <p>CDL.7.B.16 Differentiate among cycads, gymnosperms, and angiosperms</p> <p>CDL.7.B.17 Describe the structure and function of the major parts of a plant:</p> <ul style="list-style-type: none"> ➤ roots ➤ stems ➤ leaves ➤ flowers <p>CDL.7.B.18 Relate the structure of plant tissue to its function</p> <ul style="list-style-type: none"> ➤ epidermal ➤ ground ➤ vascular <p>CDL.7.B.19 Evaluate the medical and economic importance of plants (MCO)</p>
<p>Strand: Classification and the Diversity of Life Concept: Structure and Function/ Cycles Resource: Biology, Chapter 18,20,21,22,23,25,26,27,28 15 days</p>	<p>CDL.7.B.8 Compare and contrast life cycles of familiar organisms</p> <ul style="list-style-type: none"> ➤ sexual reproduction ➤ asexual reproduction ➤ metamorphosis ➤ alternation of generations <p>CDL.7.B.20 Identify the symmetry of organisms:</p> <ul style="list-style-type: none"> ➤ radial ➤ bilateral ➤ asymmetrical <p>CDL.7.B.21 Compare and contrast the major invertebrate classes according to their nervous, respiratory, excretory, circulatory, and digestive systems</p> <p>CDL.7.B.22 Compare and contrast the major vertebrate classes according to their nervous, respiratory, excretory, circulatory, digestive, reproductive and integumentary systems</p>

<p>Strand: Ecology and Behavioral Relationships Concept: Population and Human Impact Resource: Biology, Chapter 36, 38 Reference Connection and Talking About Science Sections throughout the book (Example pg 28) 8 Days</p>	<p>NS.14.B.3 Evaluate long-range plans concerning resource use and by-product disposal for environmental, economic, and political impact (MCO)</p> <p>EBR.9.B.1 Analyze the effects of human population growth and technology on the environment/biosphere (MCO)</p> <p>EBR.9.B.2 Evaluate long range plans concerning resource use and by-product disposal in terms of their environmental, economic, and political impact (MCO)</p> <p>EBR.9.B.3 Assess current world issues applying scientific themes (e.g., global changes in climate, epidemics, pandemics, ozone depletion, UV radiation, natural resources, use of technology, and public policy) (MCO)</p> <p>NS.15.B.1 Research and evaluate science careers using the following criteria:</p> <ul style="list-style-type: none"> ➤ salary ➤ availability of jobs ➤ working conditions ➤ educational requirements
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