North Panola School District Pacing Guide

Mississippi
BIOLOGY (Traditional)
2016-2017 Pacing Guide

Unit	Objective	Major Topics/Concepts
Introduction to Biological Inquiry	1a 1b 1c 1d 1e 1f 1g	Safety rules and symbols Lab equipment Scientific method Experimental design (controlled experiment) Independent vs. dependent variables Graphing Microscope parts and functions *This content should be embedded and reinforced through actual experimentation throughout the course, but all inquiry topics should be introduced by the 1st benchmark. These objectives will be assessed in the context of the units covered on every benchmark.*
Chemistry	2a 2b 2c 2d 2e	Atoms Chemical bonds Properties of water Organic compounds Chemical reactions pH scale Acids and bases Enzymes
Cell Structure and Function	4a	Prokaryotic vs. eukaryotic cells Organelle structure and function Cell membrane and transport of materials Mobility (e.g., cilia, flagella, pseudopodia)
1st Cumulative Benchmark (covering all content to this point)		
Photosynthesis and Cellular Respiration	2f 2g	ATP structure and function Photosynthesis reactants and products and their roles Requirements and products for light-dependent and light-independent reactions Respiration reactants and products and their roles Products and energy differences between anaerobic and aerobic respiration
Cell Division and Growth	4b	Distinguish between types of cell reproduction Cell cycle events Mitosis (contrast plant and animal cell division) Binary fission (e.g., budding, vegetative propagation) Significance of meiosis in sexual reproduction Significance of crossing over Compare/contrast mitosis and meiosis Cancer

Unit	Objective	Major Topics/Concepts
Genetics	5b	Mendel's laws Probability Monohybrid crosses Punnett squares for complete and incomplete dominance, codominance, sex-linked and multiple alleles Outcome percentages for genotypes and phenotypes for all crosses
DNA and RNA	5a	Central dogma of molecular biology Genes and gene regulation DNA structure DNA replication RNA structure Transcription Translation Types of RNA mRNA codon chart
2nd Cumulative Benchmark (covering all content to this point)		
Mutations, Genetic Engineering, and the Human Genome	5c 5d	Characteristics and implications of chromosomal and gene mutations Significance of nondisjunction, deletion, substitutions, translocation, and frameshift mutations in animals Examine inheritance patterns using genetic engineering technology (e.g., pedigrees, karyotypes, gel electrophoresis) Occurrence and significance of genetic disorders such as sickle cell anemia, Tay-Sachs disorder, cystic fibrosis, hemophilia, Down Syndrome, color blindness
Biological Evolution	6b 6c 6d 6e	Critique data used by scientists to develop understanding of evolutionary processes and patterns (e.g., Redi, Needham, Spallanzani, Pasteur) Differentiate among chemical evolution, organic evolution, and evolutionary steps to aerobic heterotrophs and photosynthetic autotrophs Summarize contributions of Darwin, Malthus, Wallace, Lamarck, and Lyell to the development of the theory of evolution Role of natural selection Mechanisms of speciation (e.g., mutations, adaptations, geographic isolation) Applications of speciation (e.g., pesticide and antibiotic resistance)
Classification	4c 6a	Classification based on evolutionary relationships (cladograms) Characteristics of six kingdoms Taxonomy Binomial nomenclature Body symmetry Sexual vs. asexual reproductive methods

Unit	Objective	Major Topics/Concepts
		Organizational levels of organisms (e.g., cells, tissues, organs, systems, types of tissues)
Plants	4d	Plant structures and cellular functions related to survival (roots, stems, leaves, flowers) Vascular vs. nonvascular Specialized tissues (xylem, phloem) Reproduction Hormones
Ecology	3a 3b 3c	Plant and animal species, climate, and adaptations of organisms in the major biomes Biotic vs. abiotic factors in ecosystems Energy flow (e.g., energy pyramids, producers, herbivores, carnivores, decomposers) Beneficial bacteria Cooperation Predation Parasitism Commensalism Symbiosis Mutualism Significance of natural events and human activities on major ecosystems (e.g., succession, population growth, technology, resource use, biodiversity, sustainable use)
Final Comprehensive Benchmark (covering all content)		