Neshoba County School
District Pacing Guides

BIOLOGY I

Nine Weeks	Objectives	Date Assessed
1	**1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.** a. Conduct a scientific investigation demonstrating safe procedures and proper care of laboratory equipment. (DOK 2) • Safety rules and symbols • Proper use and care of the compound light microscope, slides, chemicals, etc. • Accuracy and precision in using graduated cylinders, balances, beakers, thermometers, and rulers	
1	**1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.** b. Formulate questions that can be answered through research and experimental design. (DOK 3)	
1	**1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.** c. Apply the components of scientific processes and methods in classroom and laboratory investigations (e.g., hypotheses, experimental design, observations, data analyses, interpretations, theory development). (DOK 2)	
1	**1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.** d. Construct and analyze graphs (e.g., plotting points, labeling x-and y-axis, creating appropriate titles and legends for circle, bar, and line graphs). (DOK 2) • Basic chemical composition of each group • Building components of each group (e.g., amino acids, monosaccharides, nucleotides, etc.) • Basic functions (e.g., energy, storage, cellular, heredity) of each group	
1	**1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.** e. Analyze procedures, data, and conclusions to determine the scientific validity of research. (DOK 3) • Enzyme structure • Enzyme function, including enzyme-substrate specificity and factors that affect enzyme function (pH and temperature)	
1	**1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.** f. Recognize and analyze alternative explanations for experimental	

	results and to make predictions based on observations and prior knowledge. (DOK 3) • ATP structure • ATP function	
1	**1. Apply inquiry-based and problem-solving processes and skills to scientific investigations.** g. Communicate and defend a scientific argument in oral, written, and graphic form. (DOK 3) • Photosynthesis and respiration (reactants and products) • Light-dependent reactions and light independent reactions in • photosynthesis, including requirements and products of each • Aerobic and anaerobic processes in cellular respiration, including products of each and energy differences	
2	**3. Investigate and evaluate the interaction between living organisms and their environment.** a. Compare and contrast the characteristics of the world's major biomes (e.g., deserts, tundra, taiga, grassland, temperate forest, tropical rainforest). (DOK 2) • Plant and animal species • Climate (temperature and rainfall) • Adaptations of organisms	
2	**3. Investigate and evaluate the interaction between living organisms and their environment.** b. Provide examples to justify the interdependence among environmental elements. (DOK 2) • Biotic and abiotic factors in an ecosystem (e.g., water, carbon, oxygen, mold, leaves) • Energy flow in ecosystems (e.g., energy pyramids and photosynthetic organisms to herbivores, carnivores, and decomposers) • Roles of beneficial bacteria • Interrelationships of organisms (e.g., cooperation, predation, parasitism, commensalism, symbiosis, and mutualism)	
2	**3. Investigate and evaluate the interaction between living organisms and their environment.** c. Examine and evaluate the significance of natural events and human activities on major ecosystems (e.g., succession, population growth, technology, loss of genetic diversity, consumption of resources). (DOK 2)	
2	**4. Analyze and explain the structures and function of the levels of biological organization.** a. Differentiate among plant and animal cells and eukaryotic and prokaryotic cells. (DOK 2) • Functions of all major cell organelles and structures (e.g., nucleus, mitochondrion, rough ER, smooth ER, ribosomes, Golgi bodies, vesicles, lysosomes, vacuoles, microtubules, microfilaments, chloroplast, cytoskeleton, centrioles, nucleolus,	

	chromosomes, nuclear membrane, cell wall, cell membrane [active and passive transport], cytosol) • Components of mobility (e.g., cilia, flagella, pseudopodia)	
2	**2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.** a. Explain and compare with the use of examples the types of bond formation (e.g., covalent, ionic, hydrogen, etc.) between or among atoms. (DOK 2) • Subatomic particles and arrangement in atoms • Importance of ions in biological processes	
2	**2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.** b. Develop a logical argument defending water as an essential component of living systems (e.g., unique bonding and properties including polarity, high specific heat, surface tension, hydrogen bonding, adhesion, cohesion, and expansion upon freezing). (DOK 2)	
2	**2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.** c. Classify solutions as acidic, basic, or neutral and relate the significance of the pH scale to an organism's survival (e.g., consequences of having different concentrations of hydrogen and hydroxide ions). (DOK 2)	
2	**2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.** d. Compare and contrast the structure, properties, and principle functions of carbohydrates, lipids, proteins, and nucleic acids in living organisms. (DOK 2) • Basic chemical composition of each group • Building components of each group (e.g., amino acids, monosaccharides, nucleotides, etc.) • Basic functions (e.g., energy, storage, cellular, heredity) of each group	
2	**2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.** e. Examine the life processes to conclude the role enzymes play in regulating biochemical reactions. (DOK 2) • Enzyme structure • Enzyme function, including enzyme-substrate specificity and factors that affect enzyme function (pH and temperature)	
2	**2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.** f. Describe the role of adenosine triphosphate (ATP) in making energy available to cells. (DOK 1) • ATP structure • ATP function	

2	**2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.** g. Analyze and explain the biochemical process of photosynthesis and cellular respiration and draw conclusions about the roles of the reactants and products in each. (DOK 3) • Photosynthesis and respiration (reactants and products) • Light-dependent reactions and light independent reactions in photosynthesis, including requirements and products of each • Aerobic and anaerobic processes in cellular respiration, including products of each and energy differences	
3	**4. Analyze and explain the structures and function of the levels of biological organization.** b. Differentiate between types of cellular reproduction. (DOK 1) • Main events in the cell cycle and cell mitosis (including differences in • plant and animal cell divisions • Binary fission (e.g., budding, vegetative propagation, etc.) • Significance of meiosis in sexual reproduction • Significance of crossing over	
3	**4. Analyze and explain the structures and function of the levels of biological organization.** c. Describe and differentiate among the organizational levels of organisms (e.g., cells, tissues, organs, systems, types of tissues.) (DOK 1)	
3	**4. Analyze and explain the structures and function of the levels of biological organization.** d. Explain and describe how plant structures (vascular and nonvascular) and cellular functions are related to the survival of plants (e.g., movement of materials, plant reproduction). (DOK 1)	
3	**5. Demonstrate an understanding of the molecular basis of heredity.** a. Analyze and explain the molecular basis of heredity and the inheritance of traits to successive generations by using the Central Dogma of Molecular Biology. (DOK 3) • Structures of DNA and RNA • Processes of replication, transcription, and translation • Messenger RNA codon charts	
3	**5. Demonstrate an understanding of the molecular basis of heredity.** b. Utilize Mendel's laws to evaluate the results of monohybrid Punnett squares involving complete dominance, incomplete dominance, codominance, sex linked, and multiple alleles (including outcome percentage of both genotypes and phenotypes.) (DOK 2)	
3	**5. Demonstrate an understanding of the molecular basis of heredity.** c. Examine inheritance patterns using current technology (e.g., pedigrees,	

	karyotypes, gel electrophoresis). (DOK 2)	
3	**5. Demonstrate an understanding of the molecular basis of heredity.** d. Discuss the characteristics and implications of both chromosomal and gene mutations. (DOK 2) • Significance of nondisjunction, deletion, substitutions, translocation, and frame shift mutation in animals • Occurrence and significance of genetic disorders such as sickle cell anemia, Tay-Sachs disorder, cystic fibrosis, hemophilia, Downs Syndrome, color blindness	
3	**6. Demonstrate an understanding of principles that explain the diversity of life and biological evolution.** a. Draw conclusions about how organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their evolutionary relationships. (DOK 2) • Characteristics of the six kingdoms • Major levels in the hierarchy of taxa (e.g., kingdom, phylum/division, class, order, family, genus, and species) • Body plans (symmetry) • Methods of sexual reproduction (e.g., conjugation, fertilization, pollination) • Methods of asexual reproduction (e.g., budding, binary fission, regeneration, spore formation)	
3	**6. Demonstrate an understanding of principles that explain the diversity of life and biological evolution.** b. Critique data (e.g., comparative anatomy, Biogeography, molecular biology, fossil record, etc.) used by scientists (e.g., Redi, Needham, Spallanzani, Pasteur) to develop an understanding of evolutionary processes and patterns. (DOK 3)	
4	**6. Demonstrate an understanding of principles that explain the diversity of life and biological evolution.** c. Research and summarize the contributions of scientists, (including Darwin, Malthus, Wallace, Lamarck, and Lyell) whose work led to the development of the theory of evolution. (DOK 2)	
4	**6. Demonstrate an understanding of principles that explain the diversity of life and biological evolution.** d. Analyze and explain the roles of natural selection, including the mechanisms of speciation (e.g., mutations, adaptations, geographic isolation) and applications of speciation (e.g., pesticide and antibiotic resistance). (DOK 3)	
4	**6. Demonstrate an understanding of principles that explain the diversity of life and biological evolution.** e. Differentiate among chemical evolution, organic evolution, and the evolutionary steps along the way to aerobic heterotrophs and photosynthetic autotrophs. (DOK 2)	