



| TERM | COMPETENCY/OBJECTIVE | DOK LEVEL | PLD | BLUEPRINT DATA |
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| | * This pacing guide is built using the new 2010 frameworks. Completely new items are highlighted and will not be tested in the 2009-2010 school year, but are recommended for use in Biology curricula during the upcoming school year. | | | 89 Total Items 70 Core/19 Field Test |
| 1st Nine Weeks Aug 10 th – Oct 7 th | 1. Apply inquiry- based and problem solving processes and skills to scientific investigations. <i>(Objectives 1b,1c,1d,1f, and 1g should be continually reinforced throughout school year)</i> | | | 15 |
| | 1a. Conduct a scientific investigation demonstrating safe procedures and proper care of laboratory equipment. <ul style="list-style-type: none"> Safety rules and symbols (school wide), proper care of lab equipment, accuracy and precision in using graduated cylinders, balances, beakers, thermometers, and rulers | 2 | Proficient | |
| | 1b. Formulate questions that can be answered through research and experimental design. | 3 | | |
| | 1c. Apply the components of scientific processes and methods in classroom and laboratory investigations. <ul style="list-style-type: none"> Hypotheses, experimental design (dependent and independent variables, control and experimental groups, constants), observations, data analyses, interpretation, theory development | 2 | | |
| | 1d. Construct and analyze graphs. <ul style="list-style-type: none"> Plotting points, labeling graphs appropriately, circle, bar and line graphs (line of best fit) | 2 | | |
| | 1e. Analyze procedures, data, and conclusions to determine the scientific validity of research. | 3 | | |
| | 1f. Recognize and analyze alternative explanations for experimental results and to make predictions based on observations and prior knowledge. | 3 | | |
| | 1g. Communicate and defend a scientific argument in oral, written, and graphic form. | 3 | | |

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| | 3. Investigate and evaluate the interaction between living organisms and their environment. | | | 10 |
| | 3a. Compare and contrast the characteristics of the world’s major biomes (deserts, tundra, taiga, grassland, temperate forest, tropical rainforest). <ul style="list-style-type: none"> • Identify: plant and animal species, climate (temp and rainfall), adaptations of organisms | 2 | | |
| | 3b. Provide examples to justify the interdependence among environmental elements. <ul style="list-style-type: none"> • Biotic and abiotic factors (water, carbon, oxygen, mold, leaves) • Energy flow in ecosystems (energy pyramids, photosynthetic organisms to herbivores, carnivores, and decomposers) • Roles of beneficial bacteria • Interrelationships of organisms (cooperation, predation, parasitism, commensalism, symbiosis, and mutualism) | 2 | | |
| | 3c. Examine and evaluate the significance of natural events and human activities on major ecosystems (succession, population growth, technology, loss of genetic diversity, consumption of resources). | 2 | | |
| | 2. Describe the biochemical basis of life and explain how energy flows within and between the living systems. | | | 8 |
| | 2a. Explain and compare, with the use of examples, the types of bond formation (covalent, ionic, hydrogen) between or among atoms. <ul style="list-style-type: none"> • Subatomic particles and arrangement in atoms • Importance of ions in biological processes | 2 | | |

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| | <p>2b. Develop a logical argument defending water as an essential component of living systems.</p> <ul style="list-style-type: none"> • Unique bonding • Polarity • High specific heat • Surface tension • Hydrogen bonding • Adhesion and cohesion • Expansion upon freezing | 2 | | |
| | <p>2c. Classify solutions as acidic, basic, or neutral and relate the significance of the pH scale to an organism's survival(consequences).</p> | 2 | | |
| | <p>2d. Compare and contrast the structure, properties, and principle functions of carbohydrates, lipids, proteins, and nucleic acids in living systems.</p> <ul style="list-style-type: none"> • Basic chemical composition of each group • Building components of each group (amino acids, monosaccharides, nucleotides) • Basic functions (energy storage, cellular, heredity) of each group | 2 | | |
| | <p>2e. Examine the life processes to conclude the role enzymes play in regulating biochemical reactions.</p> <ul style="list-style-type: none"> • Enzyme structure • Enzyme function, including enzyme-substrate specificity and factors that effect enzyme function (pH and temperature) | 2 | | |
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| 2nd Nine Weeks Oct 12 th – Dec 15 th | 1. Apply inquiry- based and problem solving processes and skills to scientific investigations. | | | 15 |
| | 1a. Conduct a scientific investigating demonstrating safe procedures and proper care of laboratory equipment. <ul style="list-style-type: none"> ➤ Microscope <ul style="list-style-type: none"> • Parts of a microscope • Making wet mounts • Proper care of a microscope • Light and electron microscopes • Magnification | 2 | | |
| | 4. Analyze and explain the structures and function of the levels of biological organization. | | | 15 |
| 4a. Differentiate between prokaryotic and eukaryotic cells. <ul style="list-style-type: none"> ➤ Cell Discovery <ul style="list-style-type: none"> • Cell Theory • Differences in structure and size • Differences in organisms * Prokaryotic structure will be discussed in more detail when bacteria are studied | 2 | | | |

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| | <p>4a. Identify and describe the structure and basic functions of the major eukaryotic cells.</p> <ul style="list-style-type: none"> • Nucleus, nuclear envelope, and nucleolus • Mitochondria • Rough ER • Smooth ER • Ribosomes • Golgi apparatus • Vesicles • Lysosomes • Vacuoles • Microfilaments, microtubules, cilia, flagella, and centrioles • Chloroplast • Cytoskeleton • Cell wall • Cell membrane • Cytosol • Pseudopodia | 2 | | |
| | <p>4a. Distinguish between plant and animal cell structures.</p> <ul style="list-style-type: none"> • Chloroplast/chlorophyll • Vacuoles • Cell wall | 2 | | |
| | <p>4c. Describe the way in which cells are organized in multicellular organisms.</p> | 1 | | |

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| | <p>4a. Relate cell membrane structure to its function in passive and active transport.</p> <ul style="list-style-type: none"> • Cell membrane structure—phospholipid bilayer, integral and surface proteins, fluid mosaic model • Passive transport—diffusion, facilitated diffusion, osmosis • Active transport—sodium/potassium pump, endocytosis (phagocytosis and pinocytosis), exocytosis | 2 | | |
| | <p>2. Describe the biochemical basis of life and explain how energy flows within and between the living systems.</p> | | | 8 |
| | <p>2f. Describe the structure of ATP and its importance in life processes.</p> | 1 | | |
| | <p>2g. Examine, compare, and contrast the basic processes of photosynthesis and cellular respiration.</p> <ul style="list-style-type: none"> • Glycolysis, Krebs’s cycle, and ETC—ATP (energy) produced, NADH, oxygen needs, and carbon dioxide produced • Light-dependent and light-independent reactions—requirements and products • Chemical equations for photosynthesis and cellular respiration | 3 | | |
| | <p>2g. Compare and contrast aerobic and anaerobic respiration.</p> <ul style="list-style-type: none"> • Fermentation—energy produced and products • Compare cell respiration and fermentation | 3 | | |
| | <p>Review Objectives from 1st Nine Weeks 1a,1b,1c,1d,1e,1f,1g,3a,3b,3c,2a,2b,2c,2d,2e</p> | | | |

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| 3rd Nine Weeks Jan 5 th – Mar 9 th | 4. Analyze and explain the structures and function of the levels of biological organization. | | | 15 |
| | 4b. Describe the main events of the cell cycle and cell mitosis including differences in plant and animal cell divisions. <ul style="list-style-type: none"> • Phases of the cell cycle • Mitosis—prophase, metaphase, anaphase, and telophase • Differences in mitosis of plant and animal cells • Meiosis—stages of meiosis I and meiosis II. • Process and significance of crossing over • Significance of meiosis to sexual reproduction • Forms of asexual reproduction such as budding, vegetative propagation, etc. | 1 | | |
| | 5. Demonstrate an understanding of the molecular basis of heredity. | | | 10 |
| 5a. Compare and contrast the molecular structures of DNA and RNA as they relate to replication, transcription, and translation. <ul style="list-style-type: none"> • DNA structure • RNA structure • Compare and contrast DNA and RNA • Processes of replication, transcription, and translation • Read and translate the genetic code chart | 3 | | | |

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| | <p>5d. Identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes.</p> <ul style="list-style-type: none"> • Point mutations--deletion and insertion • Frame shift mutations • Chromosomal mutations—nondisjunction, translocations • Occurrence and significance of genetic disorders—sickle cell anemia, Tay-Sachs disorder, cystic fibrosis, hemophilia, Downs syndrome, color blindness | 2 | | |
| | <p>5b. Utilize Mendel’s laws to evaluate the results of monohybrid Punnett squares involving complete dominance, incomplete dominance, codominance, sex linked, and multiple alleles.</p> <ul style="list-style-type: none"> • Punnett squares—monohybrid • Express outcome of Punnett squares as ratios and percentages | 2 | | |
| | <p>5c. Examine inheritance patterns using currently technology.</p> <ul style="list-style-type: none"> • Pedigrees • Karyotypes • Gel electrophoresis | 2 | | |
| | <p>Review Objectives from 1st and 2nd Nine Weeks 1a,1b,1c,1d, 1e,1f,1g,2a,2b,2c,2d,2e,2f,2g,3a,3b,3c,4a,4c,</p> | | | |

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| 4th Nine Weeks Mar 12 th – May 21 st | SAT April 26 th – April 29 th | | | |
| | 6. Demonstrate an understanding of principles that explain the diversity of life and biological evolution. | | | 12 |
| | 6a. Draw conclusion about how organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their evolutionary relationships <ul style="list-style-type: none"> • Characteristics of the 6 kingdoms • Major levels in the hierarchy of taxa (KPCOFGS) • Body plans (symmetry) • Methods of sexual reproduction (conjugation, fertilization, pollination) • Methods of asexual reproduction (budding, binary fission, regeneration, spore formation) | 2 | | |
| | 6b. Critique data (comparative anatomy, Biogeography, molecular biology, fossil record) used by scientists (Redi, Needham, Spallanzani, Pasteur) to develop an understanding of evolutionary processes and patterns. | 3 | | |
| | 6c. 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. | 2 | | |
| 6d. Analyze and explain the roles of natural selection, including the mechanisms of speciation (mutations, adaptations, geographic isolation) and applications of speciation (pesticide and antibiotic resistance). | 3 | | | |
| 6e. Differentiate among chemical evolution, organic evolution, and the evolutionary steps along the way to aerobic heterotrophs and photosynthetic autotrophs. | 2 | | | |