

### Biology Pacing Guide- Mater Lakes Academy Middle/High

First Nine Weeks	Second Nine Weeks	Third Nine Weeks	Fourth Nine Weeks
<p><b>Baseline &amp; Lab Safety</b></p> <p><b>Unit 1:</b> Nature of Science, Microscopes, Tools, Technology &amp; Biology (5 block days) I- Introduction to Biology/Nature of Life What is Biology -Science in the real world</p> <p><b>Unit 2:</b> II- Biochemistry, Enzymes, &amp; Properties of Water (6 block days)</p> <ul style="list-style-type: none"> <li>Types (carbohydrates, proteins, lipids, and nucleic acids)</li> <li>Structure and review function</li> <li>Review of connections to biological processes</li> </ul> <p>III- Role of Proteins in the Body: Enzymes (18.11)</p> <ul style="list-style-type: none"> <li>As a catalyst to reduce activation energy</li> <li>Factors affecting enzyme function: pH temperature, concentration</li> </ul> <p><b>Unit 3:</b> IV- Cell Structure &amp; Function (8 block days) Review of Cells (14.1, 14.3)</p> <ul style="list-style-type: none"> <li>Cell theory and discovery (14.1)</li> <li>Compare/contrast cell types (14.3) (prokaryote, eukaryotic, plant, animal)</li> <li>Organelles and membrane: roles and functions (14.3)</li> <li>Role of lipids in cell membrane (18.1)</li> <li>Role of membrane in cell transport: Highly selective barrier (14.2)</li> </ul> <p><b>Unit 4:</b> V- Botany (4 block days) What defines a plant (14.7)</p> <ul style="list-style-type: none"> <li>Overview of Plants: Organs, tissues, evolution (14.7)</li> <li>Physiological Processes of Plants (Growth, Reproduction, Transpiration, Photosynthesis, Cellular respiration) (14.7 and 18.12)</li> </ul>	<p><b>Unit 5:</b> Cell Energy (8 block days) VI- Cell energy: Photosynthesis (18.9)</p> <ul style="list-style-type: none"> <li>Equation of Photosynthesis (18.7)</li> <li>Where it occurs (14.7)</li> <li>Non-plant examples of photosynthetic organisms (15.6)</li> <li>Role of carbohydrates as a source of energy (18.1)</li> </ul> <p>VII- Cell energy: Cellular Respiration (18.9)</p> <ul style="list-style-type: none"> <li>Equation for Cellular Respiration (18.8, 18.9)</li> <li>ADP/ATP cycle (18.10)</li> <li>Interrelation of Photosynthesis and Cellular Respiration (18.8)</li> </ul> <p><b>VIII- Unit 6:</b> Molecular genetics (replication, transcription, translation, and mutation) &amp; Biotechnology (9 block days) VIII- DNA and Replication (16.3)</p> <ul style="list-style-type: none"> <li>Experiments and History</li> <li>Universal code for all organisms (16.9)</li> <li>Review of structure of DNA and chromosomes and location in cell</li> <li>Role of Nucleic acids in organisms (18.1)</li> <li>DNA Replication in Cell Cycle (16.3, 16.17)</li> <li>Types of mutations and effects (16.4)</li> </ul> <p>IX- RNA and Protein Synthesis (16.3) (3-13 to 3-22)</p> <ul style="list-style-type: none"> <li>RNA synthesis: Transcription (16.3, 16.5)</li> <li>Protein synthesis: Translation (16.5)</li> <li>Types of mutations: harmful, beneficial, variation, neutral (16.4)</li> </ul> <p>X- Biotechnology (16.10) (2-23 to 2-28)</p> <ul style="list-style-type: none"> <li>Predicting impact on society, individual, and environment (16.10)</li> <li>Medical and ethical issues (16.10)</li> </ul> <p><b>Unit 7:</b> Cell Reproduction: Part 1: Mitosis and Cancer (3 block days) XI- Comparing Cell Processes: Mitosis (16.17)</p> <ul style="list-style-type: none"> <li>Cell Cycle (16.14)</li> <li>Process of Mitosis: Nuclear Division (16.14)</li> <li>Mistakes in Mitosis (16.8)</li> <li>Asexual Reproduction: Lack of genetic variation.</li> </ul> <p style="text-align: center;">Mid -Year Assessment</p>	<p><b>Unit 8:</b> XII- Comparing Cell Processes: Meiosis (16.18) (5 block days)</p> <ul style="list-style-type: none"> <li>Process: creating gametes and independent assortment (16.16)</li> <li>Crossing over and non-disjunction (16.16)</li> <li>Genetic variation resulting from meiosis (16.16)</li> <li>Comparison of Mitosis and Meiosis (16.17)</li> </ul> <p><b>Unit 9:</b> XIII- Mendelian Genetics (7 block days) Review Heredity - Mendelian (16.1)</p> <ul style="list-style-type: none"> <li>Law of segregation and independent assortment (16.1)</li> <li>Other patterns of inheritance: co-dominance, incomplete dominance, polygenic, sex-linked, multiple alleles (16.2)</li> <li>Punnett Squares: Mono-Dihybrid (16.1)</li> <li>Predict and analyze pedigrees</li> <li>Genetic Drift/Gene flow (15.14)</li> </ul> <p><b>Unit 10:</b> Evolution (8 block days) XIV-Origins of Life (15.8)</p> <ul style="list-style-type: none"> <li>Origins of Life (15.8, 18.1)</li> <li>Endosymbiotic Theory (15.8)</li> </ul> <p>XV- Theory of Evolution (15.1)</p> <ul style="list-style-type: none"> <li>Evidence for the theory of evolution</li> <li>Trends in human evolution: brain structure, brain size, jaws, tools (15.10, 14.26)</li> </ul> <p>XVI-Mechanisms of Evolution (15.13)</p> <ul style="list-style-type: none"> <li>Evolution through Natural Selection (15.1)</li> <li>Darwin's Natural Selection (15.13)</li> <li>Introduction to other Mechanisms (15.14, 15.15)</li> </ul> <p>XVII- Taxonomy/Classification (15.6)</p> <ul style="list-style-type: none"> <li>Classify organisms based on evolutionary relationships (15.4)</li> <li>Three Domains and Six Kingdoms (15.6)</li> <li>Reasons for changes in how organisms are classified. (15.5)</li> </ul> <p><b>Unit 11:</b> Ecology: Part 1 - (5 block days) XVIII- Ecosystems (17.5)</p> <ul style="list-style-type: none"> <li>Succession and changes (17.4)</li> <li>Impact from catastrophic events: Climate change, Human activity, Invasive species (17.8)</li> <li>Distribution of life in aquatic systems (17.2)</li> </ul> <p>XIX- Populations in an ecosystem (17.5)</p> <ul style="list-style-type: none"> <li>Population dynamics and graphs</li> <li>Carrying capacity</li> <li>Limiting Factors</li> </ul>	<p><b>Unit 12:</b> Ecology: Part 2 (5 block days) XX- Energy Flow (17.9)</p> <ul style="list-style-type: none"> <li>Trophic levels and energy reduction (17.9)</li> <li>Biogeochemical Cycles: water and carbon (E.7.1, 18.12)</li> </ul> <p>XXI- Human Impact on Environment (17.20)</p> <ul style="list-style-type: none"> <li>Sustainability and environmental policy (17.11)</li> <li>Costs and benefits of renewable and non-renewable resources (17.11)</li> </ul> <p><b>Unit 13:</b> Human Biology (6 block days) XXII- Brain &amp; Circulatory System (14.36)</p> <ul style="list-style-type: none"> <li>Functions of the Heart</li> <li>Factors affecting blood flow</li> </ul> <p>XXIII- Immune System (14.52)</p> <ul style="list-style-type: none"> <li>Basic Function of immune system</li> <li>Types of Responses (14.52)</li> <li>Human Health and Disease Transmission (14.6)</li> <li>Fighting Infectious Diseases (14.52, 15.13)</li> </ul> <p>XXIV- Human Reproductive system (16.13)</p> <ul style="list-style-type: none"> <li>Basic Anatomy and Physiology: Male and Female</li> <li>Human Development – Fertilization to Birth (all stages)</li> <li>External Membranes</li> </ul> <p><b>CRUNCH TIME- REVIEW</b> Population Ecology (17.5), Energy Flow (17.9), Human Impact (17.20), Theory of Evolution (15.1), Classification (15.6), Origins of Life (15.8), Natural Selection (15.13), Cells (14.1,14.3), Plant Anatomy (14.7), Macromolecules (18.1), Photosynthesis and Cellular Respiration (18.9), Properties of Water (18.12), Genetics (16.1), DNA and RNA (16.3)</p>

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