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| **First Trimester** |
| Standard: SPES Standards 1-8 |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 1.1: What is Science | SPES: 1, 2, 3, 5, 6, 7 | Experimental Design, Analyzing & Interpreting Data, Lab Technique & Measurements, Interpreting Analogies & Models, and Developing Models Based on Investigations |
|  | 1.2: Science in Context | SPES: 1, 4, 8 | Scientific Method, Evaluation & Peer Review, Explain Major Scientific Theories |
|  | 1.3: Studying Life | SPES: 9, 10, 11 | Recognize Role of Scientific Discovery, Impact of New Technology, and Ethical, Environmental, and Social Issues |

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| Literacy Standards Covered |  | 11-12.RS 4, 5, 6 |
| Lab: |  | The Vitruvian Man: Teaching the Scientific Method |
| Lab |  | CSI Crime Lab: DNA Fingerprinting |
| Lesson: |  | Pedigrees Web Quest |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  |  |

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| **First Trimester** |
| Standard B 1.1 Compare and contrast the shape and function of essential biological macromolecules as well as how chemical elements can combine to form these biomolecules. Standard B 1.2: Analyze how the shape of a molecule determines its role in the many different types of cellular processes and understand that the majority of these processes involve proteins that act as enzymes. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 2.1: Nature of Matter | B 1.1 | Atoms, nucleus, electrons, protons, neutrons, element, compound, ions, ionic bonds, covalent bonds, polar bonds, Van der Walls forces. |
|  | 2.2: Carbon Compounds | B 1.1 | Polarity, hydrogen bonds, adhesion, cohesion, solute, solvent, solution, suspension, pH scale, acid, base, buffer, neutralization |
|  | 2.3: Carbon Compound | B 1.2 | Monomer, polymer, carbohydrate, polysaccharide, lipids, fats, nucleic acids, nucleotides, proteins, amino acids, polypeptides |
|  | 2.4: Chemical Reactions | B 1.2 | Chemical reactions, reactants, products, endothermic, exothermic, activation, energy, catalysts, enzymes, substrates |

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| Literacy Standards Covered |  | 11-12.R.S. 3, 4, 5 |
| Power Point |  | White Board Review: Atoms & Bonding |
| Lesson: |  | pH Lab |
| Lesson: |  |  |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  | Prompt # 1 & # 2 |

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| **First Trimester** |
| Standard B 2.3: Use mathematical and/or computational representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. Standard B 2.4: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Standard B 3.1: Use mathematical and/or computational representation to explain why the carrying capacity ecosystems can support limited by the available energy, water, oxygen, and minerals and by the ability of ecosystems to recycle the remains of dead organisms. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 3.1 What is Ecology | B 3.1 | Ecology, species, population, community, ecosystem, biome, biotic factor, abiotic factor |
|  | 3.2 Energy, Producers and Consumers | B 2.4 & B 3.1 | Autotroph, primary producer, photosynthesis, chemosynthesis, consumer, carnivore, herbivore, omnivore, scavenger, detritivore, decomposer |
|  | 3.3 Energy Flow in Ecosystems | B 2.3 | Food chain, zooplankton, phytoplankton, food web, trophic level, ecological pyramid, biomass |
|  | 3.4 Cycles of Matter | B 2.3, B 2.4, & B 3.1 | Biogeological cycles, nutrient cycles, nitrogen cycle, nitrogen fixation, denitrification, carbon cycle, water cycle, limiting nutrient |

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| Literacy Standards Covered |  |  |
| Lesson: |  |  |
| Lesson: |  |  |
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| Suggested Supplemental Activities |  |  |
| Writing Prompt |  |  |

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| **First Trimester** |
| Standard B 2.4: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 8.1: Energy of Life | B 2.4 | ATP, ADP, heterotroph, autotroph, photosynthesis |
|  | 8.2: Photosynthesis and Overview | B 2.4 | Chlorophyll, thylakoid, stroma, NADP, light dependent reaction, light independent reaction |
|  | 9.1: Cell Respiration | B 2.4 | Calorie, cellular respiration, aerobic, anaerobic |

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| Literacy Standards Covered |  | 11-12.RS 4, 6, 7 |
| Inspiration: Concept Map |  | Concept Map: Photosynthesis & Respiration |
| Lesson: |  |  |
| Lesson: |  |  |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  | Prompt # 3 |

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| **First Trimester** |
| Standard 3.2: Design, evaluate, and refine a model which shows how human activities and natural phenomena can change the flow of matter and energy in an ecosystem and how those changes impact the environment and biodiversity of populations in an ecosystem of different scales, as well as, how human impacts can be reduced. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 4.1: Climate | B 3.2 | Weather, climate, microclimate, greenhouse effect, climate zones, upwelling |
|  | 4.2: Niches and Communities | B 3.2 | Habitat, niche, resource, competition, predation, keystone species, symbiosis, mutualism, commensalism, parasitism |
|  | 4.3: Succession | B 3.2 | Ecological succession, primary succession, secondary succession, pioneer species, climax community |
|  | 4.4: Biomes | B 3.2 | Canopy, understory, humus, biomes, permafrost, climatographs |
|  | 4.5 Aquatic Ecosystems | B 3.2 | Photic zone, aphotic zone, benthic zone, plankton, estuary, wetland |

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| Literacy Standards Covered |  | 11-12. R.S. 4, 5, 6, 7, 9 11-12. W.S. 6 |
| Video: |  | The Savage Garden |
| Lab: |  | Climatology Mapping Lab & Leaf Litter Lab |
| Web Based Resource: |  | Build a Prairie Simulation |
| Suggested Supplemental Activities |  | Biome Travel Posters |
| Writing Prompt |  | Prompt # 23 & # 24 |

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| **First Trimester** |
| Standard B 3.3: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, and identify the impact of changing conditions or introducing non-native species into that ecosystem. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 5.1: How Populations Grow | B 3.3 | Population density, age structure, immigration, emigration, exponential growth, logistic growth, carrying capacity |
|  | 5.2: Limits to Grow | B 3.3 | Limiting factor, density-dependent limiting factor, density-independent limiting factor |
|  | 5.3: Human Population Growth | B 3.3 | Demography |

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| Literacy Standards Covered |  | 11-12. R.S. 1, 4, 5, 6, 7, 9 11-12. W.S. 2 |
| Software: |  | Stella: Wolf & Rabbit Simulation |
| Video: |  | Life Series: Survival |
| Lesson: |  |  |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  | Prompt # 21 & # 22 |

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| **First Trimester** |
| Standard B 3.3: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, and identify the impact of changing conditions or introducing non-native species into that ecosystem. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 6.1: A Changing Landscape | B 3.3 | Monoculture, renewable resource, non-renewable resource, sustainable development |
|  | 6.2: Using Resources Wisely | B 3.3 | Desertification. deforestation, biological magnification, acid rain |
|  | 6.3: Biodiversity | B 3.3 | Biodiversity, ecosystem diversity, species diversity, genetic diversity, ecological hot spot. |
|  | 6.4: Meeting Ecological Challenges | B 3.3 | Ecological footprint, ozone layer, aqua culture, global warming. |

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| Literacy Standards Covered |  |  |
| Web Based Activity |  | Nab the Aquatic Invader Lab |
| Lesson: |  |  |
| Lesson: |  |  |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  |  |

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| **First Trimester** |
| Standard B 1.3: Develop and use models that illustrate how a cell membrane regulates the uptake of materials essential for growth and survival while removing or preventing harmful waste materials from accumulating through the process of active and passive transport. Standard B 1.4: Develop and use models to illustrate how specialized structures within cells interact to produce, modify, and transport proteins. Standard B 1.5: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 7.1: Life is Cellular | B 1.5 | Cell theory, cell membrane, nucleus, prokaryote, eukaryote |
|  | 7.2: Cell Structure | B 1.4 | Cytoplasm, organelle, vacuole, lysosome, cytoskeleton, ribosome, endoplasmic reticulum, Golgi apparatus, chloroplast, mitochondria, cell wall, lipid bilayer, Fluid Mosaic Model |
|  | 7.3: Cell Transport | B 1.3 | Passive transport, facilitative diffusion, osmosis, tonicity, active transport, protein pump, endocytosis, exocytosis |
|  | 7.4: Homeostasis and Cells | B 1.3 | Homeostasis, cell specialization, cell - tissue - organ - system, receptor |

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| Literacy Standards Covered |  | 11-12.RS 3, 4, 5, 6, 7, 8, 9 |
| Power Point: |  | White Board Review: Cell Parts & Functions |
| Lab: |  | Egg Membrane Transport Lab |
| Lab: |  | Microscope: Plant & Animal Cells |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  | Prompt # 3 & # 4 |

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| **Second Trimester** |
| Standard B 4.4: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 10.1: Cell Growth, Division, and Reproduction | B 4.4 | Cell division, asexual reproduction, sexual reproduction |
|  | 10.2: The Process of Cell Division | B 4.4 | Chromosome, chromatin, cell cycle, interphase, mitosis, cytokinesis, centromere, chromatid |
|  | 10.3: Regulating the Cell Cycle | B 4.4 | Cyclin, growth factor, apoptosis, cancer, tumor |
|  | 10.4: Cell Differentiation | B 4.4 | Embryo, differentiation, totipotent, blastocyst, pluripotent, stem cell, multipotent |

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| Literacy Standards Covered |  | 11-12.RS 2, 4, 5, 6, 7, 9 |
| Web Based Resources: |  | Nobel Website – Cell Cycle Game |
| Power Point: |  | White Board Review: Cell Division |
| Lab: |  | Mitosis Virtual Lab |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  | Prompt # 5, # 7, & # 8 |

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| **Second Trimester** |
| Standard B 4.5: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis (2) viable errors occurring during replication and (3) mutations caused by environmental factors. B 4.6: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 11.1: The work of Gregor Mendel | B 4.5 & B 4.6 | Genetics, fertilization, trait, gene, allele, principal of dominance, segregation, gametes |
|  | 11.2: Applying Mendel's Principals | B 4.5 & B 4.6 | Probability, homozygous, heterozygous, phenotype, genotype, Punnett Square, independent assortment |
|  | 11.3: Other Patterns of Inheritance | B 4.5 & B 4.6 | Incomplete dominance, codominance, multiple alleles, polygenic traits |
|  | 11.4: Meiosis | B 4.5 | Stages of meiosis, homologous, diploid, haploid, tetrad, crossing over, zygote |

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| Literacy Standards Covered |  | 11-12.R.S. 4, 5, 6, 7, 9 |
| Power Point: |  | White Board Review: Cell Division |
| Lab: |  | Meiosis Lab & Analyzing Pedigrees Simulation Lab |
| Lesson: |  | Punnett Square Practice |
| Suggested Supplemental Activities |  | Enlivening Genetics Web Quest |
| Writing Prompt |  | Prompt # 10 |

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| **Second Trimester** |
| Standard B 4.1: Develop and Revise a model that clarifies the relationship between DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 12.1: Identifying the Substance of Genes | B 4.1 | Transformation, bacteriophage, Hershey-Chase experiment |
|  | 12.2: The Structure of DNA | B 4.1 | Chargaff's rule, base pairing, X-Ray diffraction, double helix model, hydrogen bonds |
|  | 12.3: DNA Replication | B 4.1 | Replication, DNA polymerase |

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| Literacy Standards Covered |  | 11-12.R.S. 2, 4, 5, 6, 7, 9 |
| Power Point: |  | White Board Review: DNA & Proteins |
| Web Based Resource: |  | Nobel Prize Website – DNA Game & DNA: From the Beginning |
| Video: |  | Secret of Photo 51 |
| Lab: |  | CSI: Virtual Crime Lab, 3-D DNA Model |
| Suggested Supplemental Activities: |  | ECA Resources: DNA Mutations |

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| **Second Trimester** |
| Standard B 4.2: Construct an explanation for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. B 4.3: Construct a model to explain that the unique shape and function of each protein is determined by the sequence of its amino acids, and thus is determined by the sequence of the DNA that codes for this protein. B 4.5: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis (2) viable errors occurring during replication and (3) mutations caused by environmental factors. B 4.6: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 13.1: RNA | B 4.2 & 4.3 | RNA, messenger RNA, ribosomal RNA, transfer RNA, transcription, RNA polymerase, promoter, intron, exon |
|  | 13.2: Ribosomes and Protein Synthesis | B 4.2 & 4.3 | Polypeptide, genetic code, codon, translation, anticodon, gene expression |
|  | 13.3: Mutations | B 4.5 | Mutation, point mutation, deletion, insertion, inversion, frameshift mutation, mutagen, polyploidy |
|  | 13.4: Gene Regulation and Expression | B 4.2 & 4.3 | Operon, operator, RNA interface, differentiation, homeotic gene, homeobox genes, hox gene |

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| Literacy Standards Covered |  | 11-12.R.S. 4, 5, 6, 7, 9 11-12.W.S. 6 |
| Power Point: |  | White Board Review: DNA & Proteins |
| Web Based Resource |  | Enlivening Genetics |
| Lesson: |  |  |
| Suggested Supplemental Activities |  | Karyotype Lab & Analyzing Pedigrees Lab |
| Writing Prompt |  |  |

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| **Second Trimester** |
| **Standard B 5.1: Evaluate anatomical an molecular evidence to provide an explanation of how organisms are classified and named based on their evolutionary relationships into taxonomic categories. B 5.2: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence including both anatomical and molecular evidence. B. 5.3: Apply concepts of statistics and probability to support a claim that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.** |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 16.1: Darwin's Voyage of Discovery | B 5.2 | Evolution, fossil |
|  | 16.2: Ideas that shaped Darwin's thinking | B 5.2 | Artificial selection |
|  | 16.3: Darwin presents his case | B 5.2 & 5.3 | Adaptation, fitness, natural selection |
|  | 16.4: Evidence of Evolution | B 5.3 & 5.4 | Biogeography, homologous structures, analogous structures, vestigial structures |
|  | 18.1: Finding order in diversity | B 5.1 | Binomial nomenclature, dichotomous key, genus, taxa, Linnaean classification system, kingdom, phylum, class, order, family, genus, species |
|  | 18.2: Modern evolutionary classification | B 5.1 | Phylogeny, clade, monophyletic group, cladogram |

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| Literacy Standards Covered |  | 11-12.R.S. 1, 4, 5, 6, 7, 9 |
| Web Based Activity |  | Theory of Evolution Web Quest |
| Video: |  | Darwin’s Dangerous Idea & Pre-Historical Life |
| Lesson: |  |  |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  | Prompt # 13, # 14, & # 16 |
| **Second Trimester** |
| Standard B 5.5: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individual species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 17.1: Genes and Variation | B 5.5 | Gene pool, allele frequency, single gene trait, polygenic trait |
|  | 17.2: Evolution as genetic change in populations | B 5.5 | Natural selection, directional selection, stabilizing selection, disruptive selection, genetic drift, bottleneck effect, founder effect, genetic equilibrium, Hardy-Weinburg principle |
|  | 17.3: The process of speciation | B 5.5 | Speciation, reproductive isolation, behavioral isolation, geographic isolation, temporal isolation |
|  | 17.4: Molecular evidence | B 5.5 | Molecular clock |

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| Literacy Standards Covered |  | 11-12. R.S. 1, 4, 5, 6, 7, 9 |
| Web Based Activity: |  | Natural Selection Virtual Lab |
| Lab: |  | M & M Genetic Drift Lab & Estimating Mobile Populations Lab |
| Lesson: |  |  |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  | Prompt # 15 |

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| **Second Trimester** |
| Standard B 5.6: Analyze and interpret data for patterns in the fossil record and molecular data that document the existence diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 19.1: The Fossil Record | B 5.6 | Extinction, Paleontologist, relative dating, index fossils, radiometric dating, half-life, geologic time scale, eras, periods, plate tectonics |
|  | 19.2: Patterns and Processes of Evolution | B 5.6 | Macroevolutionary patterns, cladograms, background extinction, mass extinction, gradualism, punctuated equilibrium, adaptive radiation, convergent evolution, coevolution |
|  | 19.3: Earth's Early History | B 5.6 | Miller & Urey's experiment, early DNA & RNA, origin of eukaryotic cells |

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| Literacy Standards Covered |  |  |
| Video: |  | Pre-Historical Life |
| Lesson: |  |  |
| Lesson: |  |  |
| Suggested Supplemental Activities |  |  |
| Writing Prompt |  |  |

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| **Optional Material for after the End of Course Assessment** |
| Chapter 14: Human Heredity |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 14.1: Human Chromosomes |  | Karyotypes, genome, sex chromosomes, autosomes, recessive allele, multiple alleles, sex-linked gene, inactivation, pedigrees |
|  | 14.2: Human Genetic Disorders |  | Chromosomal disorders, nondisjunction |
|  | 14.3: Studying the Human Genome |  | Manipulating DNA, restriction enzymes, gel electrophoresis, human genome project, bioinformatics |
| Chapter 15: Genetic Engineering |
| Date | Chapter Section | Standard | Vocabulary & Concepts |
|  | 15.1: Selective Breeding |  | Selective breeding, hybridization, inbreeding, biotechnology |
|  | 15.2: Recombinant DNA |  | PCR, recombinant DNA, plasmid, genetic marker, transgenic, clone |
|  | 15.3: Applications of Genetic Engineering |  | Gene therapy, DNA marker, DNA fingerprinting, forensics |
|  | 15.4: Ethics and Impacts of Biotechnology |  |  |