APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Life Science GRADE: 6 TIMELINE: Quarter 1

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 1			
Structures and Processes From Molecule to Organism MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. **I C M**	I can compare and contrast different types of cells using outside resources to research these similarities and differences. (Use of a Venn diagram, compare and contrast graphic organizers). I can identify that all living things are made of cells by examining several different examples. (e.g., chicken egg, using a microscope to view plant cells).	Analysis Application Analysis Application Synthesis	Bio/life Cell Cell theory Microorganism Microscope Multicellular Organism Unicellular
Structures and Processes From Molecule to Organism MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. **I C M**	I can construct a model of a cell and identify contributing functions by illustrating key parts of that cell.	Application Synthesis	Cell membrane Cell wall Chloroplast Cytoplasm Endoplasmic Golgi apparatus Lysosome Microorganism Nucleolus Mitochondria Nucleus Organelle reticulum Ribosome Unicellular Vacuole

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Structures and Processes From Molecule to Organism MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **I C M**	I can develop a logical argument supporting the idea that the body is a system of interacting cells by using details and examples from different sources.	Analysis Synthesis	Absorption Cell Cell membrane Cytoplasm Digestive Circulatory Respiratory Excretory Nervous Skeletal Muscular Reproductive Integumentary Endocrine Immune Gland Homeostasis Hormone Multicellular Tissue Muscle Nervous Connective Epithelial Muscle Nucleus Nutrient Organ systems Response Skeleton Stimulus

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Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Structures and Processes From Molecule to Organism MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **I C M**	I can connect how characteristic animal behavior and specialized plant structures affect successful reproduction by researching different traits of both subjects.	Analysis Synthesis	Conception Embryo Gestation Ovule Pistil Pollen Probability Reproduction Mating rituals Fertilization Stamen Stigma Trait Zygote
Structures and Processes From Molecule to Organism MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	I can describe how the environment and genetics effect the growth of an organism. I can infer that organisms have evolved over time due to environmental and genetic factors by researching human adaptations over time.	Application Analysis	Conditions Environment Gene Genetics Heredity

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RESOURCES AND NOTES FOR QUARTER 1:

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 2			
Heredity: Inheritance and Variation of Traits MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. **I C M**	I can develop a model to show that structural changes to genes have an effect on the function of a given organism.	Analysis	Allele Chromosome DNA (Deoxyribo-nucleic acid) Dominant Recessive Gene Genetics Genotype Heredity Heterozygous Homozygous Hybrid Inherit Meiosis Mutation Phenotype Punnett square Purebred Replication RNA (Ribonucleic acid) Trait
Heredity: Inheritance and Variation of Traits MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. **I C M**	I can describe the difference between asexual and sexual reproduction by examining the genetic similarities and differences of the offspring. I will examine different organisms and their offspring to support my argument.	Analysis	Allele Asexual reproduction Chromosome Genetic code Genetic variation Inheritance Mutation Sexual reproduction Trait dominant recessive

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Structures and Processes From Molecule to Organism MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. **I C M**	I can construct a diagram that represents the process of photosynthesis. I can describe the relationship between photosynthesis and the flow of energy into and out of an organism by illustrating the process.	Application Analysis Synthesis	Autotroph Carbon dioxide Cellular respiration Chlorophyll Chloroplast Fermentation Heterotroph Organelle Organism Oxygen Photosynthesis
Structures and Processes From Molecule to Organism MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. **I C M**	I can identify that food is broken down into molecules and used as energy. I can explain that an organism is dependent upon the release of energy from food by presenting collected research (e.g., PowerPoint, essay, oral presentation).	Knowledge Comprehension Application Analysis	Carbohydrate Carbon dioxide Cell cycle Chromosome Compound Cytokinesis DNA Element Enzyme Interphase Lipid Mitosis Molecule Nucleic acid Organism Photosynthesis Protein Replication Respiration

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Biological Evolution: Unity and Diversity MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. **I C M**	I can construct an explanation that describes how genetic variations have a factor on the longevity of survival and success of reproduction.	Application Synthesis	Adaptation Diversity Extinction Evolution Evolutionary descent Genetic variation Natural law Natural selection Reproduction Species Traits dominant recessive
Biological Evolution: Unity and Diversity MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. **I C M**	I can synthesize information about the impact of technology on inherited traits.	Synthesis	Adaptation Carrier Clone Ethics Evolutionary descent Gene therapy Genetic disorder Genetic engineering Genetic variation Genome Heredity Inheritance Karyotype Natural selection Pedigree Selective breeding Sex chromosome Sex-linked gene Traits dominant recessive

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Biological Evolution: Unity and Diversity MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. **I C M**	I can describe how natural selection will have a role in evolution. I can use probability and logic to determine the causes of natural selection over time.	Knowledge Analysis Application	Adaptation Diversity Diversity Evolution Evolutionary Descent Heredity Inheritance Natural selection Organism Probability Traits dominant recessive

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary

RESOURCES AND NOTES FOR QUARTER 2 :

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 3			
Biological Evolution: Unity and Diversity MS-LS4-1. Analyze and interpret data for patterns in the fossil record 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. **I C M**	I can explain the idea of evolution by defining key components and identifying critical times in history that support evolution. I can infer that natural law is constant and prove it by analyzing and interpreting data.	Comprehension Analysis	Adaptation Big bang theory Creationism Diversity Extinction Evolution Fossil Fossil record Gradualism Homologous Natural law Natural selection Scientific theory Species Traits Variation
Biological Evolution: Unity and Diversity MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. **I C M**	I can compare and contrast modern and fossil organisms to identify an evolutionary relationship.	Analysis Evaluation	Adaptation Big bang theory Creationism Evolution Diversity Evolutionary descent Extinction Fossil record Natural law Natural selection Traits

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Biological Evolution: Unity and Diversity MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. **I C M**	I can compare and contrast the embryological development of multiple species. I can identify relationships of multiple species by analyzing data.	Analysis Knowledge	Adaptation Diversity Embryo Evolution Evolutionary descent Extinction Fossil record Natural law Natural selection Organism Species Traits
Engineering Design MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. **I C M**	I can calculate the success of a given solution by combining multiple solutions and choosing the best characteristics of each. By conducting an experiment I will test different solutions and create the most successful solution.	Knowledge Application Analysis Synthesis	Hypothesis Modify Observe Predict Solution Systematic
Biological Evolution: Unity and Diversity MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. **I C M**	I can construct an explanation that describes how genetic variations have a factor on the longevity of survival and success of reproduction.	Application Synthesis	Adaptation Diversity Extinction Evolution Evolutionary descent Genetic variation Natural law Natural selection Reproduction Species Traits dominant recessive

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Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Biological Evolution: Unity and Diversity MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. **I C M**	I can synthesize information about the impact of technology on inherited traits.	Synthesis	Adaptation Carrier Clone Ethics Evolutionary descent Gene therapy Genetic disorder Genetic engineering Genetic variation Genome Heredity Inheritance Karyotype Natural selection Pedigree Selective breeding Sex chromosome Sex-linked gene Traits dominant recessive
Biological Evolution: Unity and Diversity MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. **I C M**	I can describe how natural selection will have a role in evolution. I can use probability and logic to determine the causes of natural selection over time.	Knowledge Analysis Application	Adaptation Diversity Diversity Evolution Evolutionary Descent Heredity Inheritance Natural selection Organism Probability Traits dominant recessive

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Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary

RESOURCES AND NOTES FOR QUARTER 3 :

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
TIMELINE: Quarter 4			
Ecosystems: Interactions, Energy, and Dynamics MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **I C M**	I can examine data to show that there is a cause/effect relationship between living things and the resources available in an environment. I can analyze data to determine that resources available in an ecosystem affect the population growth of an organism.	Application Analysis Analysis Evaluation	Ecosystem Bacteria Phytoplankton Herbivore Carnivore Omnivore Consumer Producer Decomposer Organism Food chain Photosynthesis Abundant resources Scarce resources
Engineering Design MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **I C M**	I can design and conduct an experiment that requires specifying a problem by defining the criteria to create a successful solution.	Synthesis Evaluation	Modify Predict Observe Hypothesis Solution
Ecosystems: Interactions, Energy, and Dynamics MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **I C M**	I can identify patterns of interactions among organisms across multiple ecosystems.	Application Synthesis	Interdependent Ecosystem Bacteria Phytoplankton Photosynthesis Herbivore Carnivore Omnivore Consumer Producer Decomposer Organism Food chain Food web

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SUBJECT: Life Science **GRADE: 6** **TIMELINE: Quarter 1**

Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Ecosystems: Interactions, Energy, and Dynamics MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. **I C M**	I can create a model to describe the flow of matter among living and nonliving parts of an ecosystem.	Synthesis	Food chain Food web Interdependent Ecosystem Bacteria Phytoplankton Herbivore Carnivore Omnivore Consumer Producer Decomposer Organism Photosynthesis
Engineering Design MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. **I C M**	I can develop a model to test objects, ideas, or processes to achieve an optimal design.	Analysis	Model Generate Data Modification Optimal Refine
Ecosystems: Interactions, Energy, and Dynamics MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. **I C M**	I can use empirical evidence to infer that changes to physical or biological components of an ecosystem can affect populations.	Evaluation	Food chain Food web Interdependent Ecosystem Bacteria Phytoplankton Herbivore Carnivore Omnivore Consumer Producer Decomposer Organism Photosynthesis Biotic Abiotic Soil erosion

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Strand/Concept Student Expectation	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Engineering Design MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **I C M**	I can evaluate competing solutions using a systemic process to determine how well they meet the criteria and constraints of the problem.	Evaluation	Modify Predict Observe Hypothesis Solution Systematic
Ecosystems: Interactions, Energy, and Dynamics MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **I C M**	I can evaluate competing solutions for maintaining biodiversity and ecosystem services.	Evaluation	Biodiversity Ecosystem Interdependent Bacteria Photosynthesis Water purification Soil erosion Nutrient recycling

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RESOURCES AND NOTES FOR QUARTER 4 :