Life Science GSE Learning Map

Prioritized Standard: S7L1.b Obtain, evaluate, and communicate information to investigate the diversity of living organisms and how they can be compared scientifically. Evaluate historical models of how organisms were classified based on physical characteristics and how that led up to the six kingdom system (currently archaea, bacteria, protists, fungi, plants, and animals). (Clarification statement: This includes common examples and characteristics such as, but not limited, to prokaryotic, eukaryotic, unicellular, multicellular, asexual reproduction, sexual reproduction, autotroph, heterotroph, and unique cell structures. Modern classification will be addressed in high school.) *Life Science*	

	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Analyze and evaluate both historical and current scientific models such as domain classification of organisms based on their characteristics and justify the placement of organisms into those systems based on these characteristics **Learning Target 2**: Ask questions and investigate other modern classification systems such as phylogenies and clades. Construct an explanation for reasons the classification system is constantly being revised
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Evaluate historical models of how organisms were classified based on physical characteristics and how that led up to the six kingdom system (currently archaea, bacteria, protists, fungi, plants, and animals). (Clarification statement: This includes common examples and characteristics such as, but not limited, to prokaryotic, eukaryotic, unicellular, multicellular, asexual reproduction, sexual reproduction, autotroph, heterotroph, and unique cell structures. Modern classification will be addressed in high school.) **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: prokaryotic, eukaryotic, unicellular, multicellular, asexual reproduction, sexual reproduction, autotroph, heterotroph, and unique cell structures including cell wall, nucleus, and chloroplast **The student will perform basic processes:** **Learning Target 2**: Use digital or print resources to compare and contrast prokaryotic and eukaryotic cells, unicellular and multicellular organisms, asexual and sexual reproduction and autotrophs and heterotrophs **Learning Target 3**: Identify the typical six kingdoms and explain the features used to classify the organisms within each kingdom **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success

Life Science GSE Learning Map

		Prioritized Standard: S7L2.a Obtain, evaluate, and communicate information to construct scientific explanations to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms. Develop a model and construct an explanation of how cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) contribute to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste. (Clarification statement: The intent is for students to demonstrate how the component structures of the cell interact and work together to allow the cell as a whole to carry out various processes. Additional structures, beyond those listed, will be addressed in high school Biology.) *Life Science*

		Proficiency Scale
4.0		**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Research and investigate the role of cell structures in additional cell processes such as endocytosis, exocytosis, and fermentation and how the structures contribute to the function of the cell in maintaining homeostasis **Learning Target 2**: Design and construct and investigation to construct an explanation of differences in hypotonic, hypertonic, and isotonic solutions (ADI lab) **Learning Target 3**: Develop and build a scale model of a specific cell. (i.e. a brown fat cell or a plant root cell). Construct an argument that describes the ways the cell's structure is specialized to support its function (for example, muscle cells in animals have a large number of mitochondria because of the excess need for energy)
3.5		In addition to score 3.0 performance, partial success at score 4.0 content
3.0		**The student will** **Learning Target 1**: Develop a model and construct an explanation that demonstrates understanding about the contribution of cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process/eliminate waste **The student exhibits no major errors or omissions.**
2.5		No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0		**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: homeostasis, equilibrium, osmosis, diffusion, cellular respiration, photosynthesis, nucleus, cytoplasm, cell wall, cell membrane, chloroplast, lysosome, mitochondria **The student will perform basic processes:** **Learning Target 2**: Understand the structure and function of cell organelles, specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosomes, and mitochondria **Learning Target 3**: Identify and explain the purpose of the processes of the cell in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5		Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0		With help, partial success at score 2.0 and score 3.0
0.5		With help, partial success at score 2.0 content but not at score 3.0 content
0.0		Even with help, no success

Life Science GSE Learning Map

Prioritized Standard: S7L2.a Obtain, evaluate, and communicate information to construct scientific explanations to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms. Develop a model and construct an explanation of how cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) contribute to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste. (Clarification statement: The intent is for students to demonstrate how the component structures of the cell interact and work together to allow the cell as a whole to carry out various processes. Additional structures, beyond those listed, will be addressed in high school Biology.) *Life Science*

		Proficiency Scale

Life Science GSE Learning Map

Prioritized Standard: S7L2.c Obtain, evaluate, and communicate information to construct scientific explanations to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms. Construct an argument that systems of the body (Cardiovascular, Excretory, Digestive, Respiratory, Muscular, Nervous, and Immune) interact with one another to carry out life processes. (Clarification statement: The emphasis is not on learning individual structures and functions associated with each system, but on how systems interact to support life processes.) *Life Science*	

	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Ask questions and investigate in order to construct an explanation about specific medical conditions (diabetes, multiple sclerosis, etc.) that may be the result of the breakdown or malfunctioning of specific cell organelles, cells, organs, or organ systems **Learning Target 2**: Construct an explanation about how multiple body systems work together to maintain homeostasis. Make a prediction about what would happen if one system was removed from the human body
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Construct an argument that justifies how multiple systems of the human body interact with one another to carry out life processes and maintain homeostasis **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: homeostasis, equilibrium, cells, tissues, organs, organ systems, organism **The student will perform basic processes:** **Learning Target 2**: Explain how body systems work together to carry out life processes and maintain homeostasis **Learning Target 3**: Develop and use a conceptual model of how cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms (S7L2) **Learning Target 4**: Identify the function of the following human body systems: Cardiovascular System, Excretory System, Digestive System, Respiratory System, Muscular System, Nervous System, and Immune System **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success

Life Science GSE Learning Map

	Proficiency Scale
	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Analyze data from Pedigree Charts to predict the likelihood of a trait being inherited through multiple generations **Learning Target 2**: Ask questions and investigate genetic disorders/mutations and the process of inheriting a specific trait, explain the disorder/mutation, and its effect on cells, tissues, and organs
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Develop and use a model to describe how asexual reproduction can result in offspring with identical genetic information while sexual reproduction results in genetic variation. (Clarification statement: Models could include, but are not limited to, the use of monohybrid Punnett squares to demonstrate the heritability of genes and the resulting genetic variation, identification of heterozygous and homozygous, and comparison of genotype vs. phenotype.) **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: Punnett square, allele, heterozygous, homozygous, dominant, recessive, chromosome, genotype, phenotype, mutation, DNA, genes, trait, chromosome **The student will perform basic processes:** **Learning Target 2**: Construct an explanation supported with scientific evidence of the role of genes and chromosomes in the process of inheriting a specific trait (S7L3a) **Learning Target 3**: Solve a monohybrid Punnett square that demonstrates the inheritance of dominant and recessive traits **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success

Prioritized Standard: S7L3.b Obtain, evaluate, and communicate information to explain how organisms reproduce either sexually or asexually and transfer genetic information to determine the traits of their offspring. Develop and use a model to describe how asexual reproduction can result in offspring with identical genetic information while sexual reproduction results in genetic variation. (Clarification statement: Models could include, but are not limited to, the use of monohybrid Punnett squares to demonstrate the heritability of genes and the resulting genetic variation, identification of heterozygous and homozygous, and comparison of genotype vs. phenotype.) *Life Science*

Life Science GSE Learning Map

	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Develop and use a model to in order to construct an explanation to describe the patterns of interactions in different ecosystems in terms of the relationships among and between organisms and the abiotic components of the ecosystem **Learning Target 2**: Analyze data to determine the impact of an invasive species such as the lion fish or kudzu on the balance on an ecosystem
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Construct an explanation to describe the patterns of interactions in different ecosystems in terms of the relationships among and between organisms and the abiotic components of the ecosystem **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: abiotic, biotic, carrying capacity, limiting factor, organism, population, ecosystem, symbiosis, competition, commensalism, parasitism, mutualism **The student will perform basic processes:** **Learning Target 2**: Understand how both biotic and abiotic factors impact the health of an ecosystem **Learning Target 3**: Identify and explain the different types of relationships (predator-prey, competition, symbiotic relationships: commensalism, parasitism, and mutualism) **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success

Prioritized Standard: S7L4.a Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. Construct an explanation to describe the patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. (Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.) *Life Science*

Life Science GSE Learning Map

Prioritized Standard: S7L4.b Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. (Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not on the biochemical mechanisms of photosynthesis and cellular respiration.) *Life Science*	

	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Develop and/or use a model or an investigation to demonstrate The Law of Conservation of Matter as it pertains to the Carbon, Water, Nitrogen, or Phosphorous Cycles **Learning Target 2**: Investigate a real-world problem related to a biogeochemical cycle and how it affects the biotic and abiotic components of an ecosystem: Carbon such as the burning of fossil fuels, greenhouse effect, or deforestation; Water such as drought or melting ice caps; Nitrogen or Phosphorous such as agriculture fertilizers, eutrophication of lakes, or industrial pollution **Learning Target 3**: Analyze data from an energy pyramid to explain why the amount of energy decreases as you move up each level of a food chain/web and explain what happens to the energy that appears to be "lost"
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Develop a model to describe the cycling of matter and the flow of energy among the biotic and abiotic components of an ecosystem **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: biotic, abiotic, food web, food chain, matter, Law of Conservation of Matter, energy, Law of Conservation of Energy, Water Cycle, Carbon Cycle **The student will perform basic processes:** **Learning Target 2**: Describe how matter such as water, oxygen, or carbon dioxide is cycled among biotic and abiotic components of an ecosystem **Learning Target 3**: Describe how energy is cycled among biotic and abiotic components of an ecosystem **Learning Target 4**: Use a model to trace the movement of energy in a food chain **Learning Target 5**: Use evidence to explain that energy is never created nor destroyed, but is transferred or converted to another form (Law of Conservation of Energy) **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success

Life Science GSE Learning Map

	Prioritized Standard: S7L4.c Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems. *Life Science*

	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Design and conduct a real-world investigation on how the size of a population changes over time in response to multiple different factors and resources; analyze and interpret data from the investigation, draw conclusions, cite evidence, and present findings **Learning Target 2**: Develop a model that explains how biological succession impacts the biotic and abiotic components of an environment over time in specific stages
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: climate, organism, population, community, ecosystem, carrying capacity, and limiting factor **The student will perform basic processes:** **Learning Target 2**: Investigate a human activity that has had an impact on individual organisms, populations, communities, or an ecosystem such as deforestation, pollution, acid rain, etc **Learning Target 3**: Investigate how resource availability, disease or climate impact individual organisms, populations, communities, or an ecosystem **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success

Life Science GSE Learning Map

	Proficiency Scale
	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Gather and analyze population data from reputable sources; cite trends in population density **Learning Target 2**: Research a specific species from the Galapagos Islands using multiple resources and simulations to communicate how natural selection determines how species inherit characteristics and change over time and present data
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Use mathematic representations to evaluate explanations of how natural selection leads to changes in specific traits of populations over successive generations **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: theory, evolution, natural selection, variation, survival of the fittest, species **The student will perform basic processes:** **Learning Target 2**: Explain how organisms change over time through natural selection **Learning Target 3**: Identify, recognize, and model how variations in organisms lead to natural selection in examples such as Darwin's Galapagos finches or the Peppered Moths during the Industrial Revolution **Learning Target 4**: Construct an explanation based on evidence that describes how genetic variation and environmental factors influence the probability of survival and reproduction of a species (S7L5) **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success

Prioritized Standard: S7L5.a Obtain, evaluate, and communicate information from multiple sources to explain the theory of evolution of living organisms through inherited characteristics. Use mathematical representations to evaluate explanations of how natural selection leads to changes in specific traits of populations over successive generations. (Clarification statement: Referencing data should be obtained from multiple sources including, but not limited to, existing research and simulations. Students should be able to calculate means, represent this data in a table or graph, and reference it when explaining the principles of natural selection.) *Life Science*

Life Science GSE Learning Map

	Prioritized Standard: S7L5.c Obtain, evaluate, and communicate information from multiple sources to explain the theory of evolution of living organisms through inherited characteristics. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, and extinction of organisms and their relationships to modern organisms. (Clarification statement: Evidence of evolution found in comparisons of current/modern organisms such as homologous structures, DNA, and fetal development will be addressed in high school.) *Life Science*

	Proficiency Scale
4.0	**In addition to score 3.0 performance, the student demonstrates in-depth inferences and applications that go beyond what was taught. For example, the student will:** **Learning Target 1**: Using digital and print resources, analyze and interpret data representing patterns in the fossil record that document the existence, diversity, and extinction of organisms and their relationships to modern organisms; using evidence from research, make a claim, and justify the evidence **Learning Target 2**: Analyze, interpret, graph, and explain data after performing a Carbon dating lab
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
3.0	**The student will** **Learning Target 1**: Analyze and interpret data for patterns in the fossil record that document the existence, diversity, and extinction of organisms and their relationships to modern organisms **The student exhibits no major errors or omissions.**
2.5	No major errors or omissions regarding score 2.0 content and partial success at score 3.0
2.0	**There are no major errors or omissions regarding the simpler details and processes.** **The student will recognize or recall specific vocabulary:** **Learning Target 1**: fossil record, radioactive dating, sediment, sedimentary rock, extinct, index fossil **The student will perform basic processes:** **Learning Target 2**: Analyze data for patterns in the fossil record that document the relationship of fossils to modern organisms **Learning Target 3**: Analyze data for patterns in the fossil record that document the existence, diversity, and extinction of organisms **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**
1.5	Partial success at score 2.0 content and major errors or omissions regarding score 3.0 content
1.0	With help, partial success at score 2.0 and score 3.0
0.5	With help, partial success at score 2.0 content but not at score 3.0 content
0.0	Even with help, no success