

I AM Performance Level Descriptors (PLDs) Biology

	Content Connector	Below Proficiency	Approaching Proficiency	At Proficiency
Analyzing Data and Mathematical Thinking				
B.3.1.a.1	Explain how given resources (energy, water, oxygen, and minerals) place limits on an ecosystem's population.	Identify limiting resources.	Describe that resources, in general, limit populations.	Evaluate the effect of a specific limited resources on an ecosystem's population.
B.3.2.a.1	Demonstrate how human activities and natural phenomena can change the flow of matter and energy in an ecosystem.	Recognize that human activities or natural events impact an ecosystem.	Identify which human activities and natural events have an impact on the ecosystem.	Demonstrate how human and natural events change the flow of matter and energy. (e.g. overhunting or lava flow have an impact on food chains)
B.3.2.a.2	Identify how human activities and natural phenomena impact the environment and biodiversity of populations in ecosystems.	Recognize that human activities and natural events can change the environment and biodiversity.	Identify human activities or natural events that impact the land and animals.	Match a particular human activity or natural phenomena to the impact on the environment and its biodiversity.
B.3.2.a.3	Describe how human impact on ecosystems can be reduced.	Recognize that some human activities impact ecosystems.	Categorize human activities based on the impacts to ecosystems. (e.g. positive or negative impact)	Explain how to reduce the impact of humans on ecosystems.
B.4.1.a.1	Describe how DNA and chromosomes influence traits passed from parents to offspring.	Recognize that parents and offspring share hereditary material.	Recognize that parents pass traits to offspring.	Describe how parents pass hereditary material to offspring. (e.g. May use a Punnett square to show the connection between parents/offspring. May match other visuals to show how an offspring received genetic material)

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SEPS.3	Planning and conducting investigations	Recognize that an investigation is based on cause and effect. (e.g. students recognize there is a beginning and end to an investigation but don't know the middle parts)	Identify the steps in an investigation.	Evaluate and modify an investigation.
SEPS.4	Analyzing and interpreting data	Identify ways to analyze or interpret data.	Identify an appropriate visual representation given a set of data.	Analyze and interpret given data from a visual representation.
SEPS.5	Using mathematics and computational thinking	Identify the parts of an equation or patterns in data. (e.g. the numbers, the symbols, etc.)	Solve an equation given the information or identify specific data.	Solve an equation or use data to make a prediction of future results
Communicating Explanations and Evaluating Claims Using Evidence				
B.5.1.a.1	Describe how organisms are named and classified (e.g., based on evolutionary relationships and taxonomic categories).	Recognize that there are taxonomic categories in which organisms are categorized.	Identify organisms based on taxonomic categories.	Group organisms based on evolutionary relationships and taxonomic categories.
B.5.4.a.1	Explain the role of natural selection in adaptation of species.	Recognize that species adapt.	Identify the role that natural selection has in the adaptation of species.	Explain the role of natural selection in the adaptation of species.
B.5.4.a.2	Describe how environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and/or (3) the extinction of other species.	Recognize that environmental conditions affect species.	Identify the environmental conditions that can change species populations.	Explain how environmental impacts may include: (1) increases in population size, and (2) the formation or extinction of a species.

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B.5.5.a.1	Describe the four primary factors affecting evolution: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a 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.	Recognize that there are factors that affect evolution.	Identify the four factors that affect evolution.	Describe the four primary factors affecting evolution: (1) species populations can increase in size, (2) the species can change, (3) compete for limited resources, and (4) the concept of survival of the fittest.
SEPS.1	Asking questions and defining problems	Recognize that a question can be scientifically tested. (Decide if this question can be scientifically tested - Yes/No)	Identify a question that can be scientifically tested. (Select which of a list of questions is the one that can be scientifically tested)	Generate a question that can be scientifically tested.
SEPS.6	Constructing explanations and designing solutions	Recognize there may be a connection between data and real world solutions	Identify data from an investigation that supports a solution	Connect investigations to the natural world using descriptions from the investigation data in order to design solutions consistent with that data.
SEPS.7	Engaging in argument based on evidence	Identify the evidence that a natural phenomenon occurred.	Select the argument based on evidence that best explains the natural phenomenon.	Use reasoning and argument based evidence to generate the best explanation for natural phenomenon, by comparing and contrasting competing ideas.
SEPS.8	Obtaining, evaluating, and communicating information	Recognize that a variety of methods and tools can be used to obtain information.	Identify which methods and tools can be used to effectively obtain information.	Employ a variety of methods and tools (e.g. diagrams, graphs, and tables) to effectively communicate and obtain information.

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Using Models to Describe and Explain Structure, Function and Processes				
B.1.1.a.1	Compare and contrast the shape and function of the essential biological macromolecules (i.e., carbohydrates, lipids, proteins, and nucleic acids).	Recognize there are macromolecules.	Identify the function of macromolecules.	Group macromolecules based upon their shape and function.
B.1.1.a.2	Describe how chemical elements (i.e., carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur) can combine to form biomolecules (i.e., carbohydrates, lipids, proteins, and nucleic acids).	Recognize an element.	Recognize that elements make up biomolecules.	Identify elements in a biomolecule from a chemical formula or chemical structure.
B.1.3.a.1	Refer to a model to explain how a cell membrane functions.	Identify a cell membrane in a model.	Label a model to show the movement of materials across a membrane.	Label a model to show that different materials move in different directions. (e.g. wastes go out, food goes in)
B.1.4.a.1	Use a model to describe the specialized structures within cells (i.e. nuclei, ribosomes, Golgi, endoplasmic reticulum).	Recognize that there are specialized structures within a cell.	Identify specialized structures within a cell. (e.g. from a list of structures)	Label a model to identify the specialized structures within the cell.
B.1.5.a.1	Use a model to describe the organization of interacting systems (cell, tissue, organ, organ system) that provide specific functions within multicellular organisms.	Recognize there are levels of organization (cell, tissue, organ, organ system).	Arrange the levels of organization (cell, tissue, organ, organ system) based on levels of complexity	Arrange the levels of organization (cell, tissue, organ, organ system) based on function.
B.2.2.a.1	Use a model to describe how cellular respiration results in a net transfer of energy.	Recognize cells transfer energy.	Recognize that the process of cellular respiration transfers energy.	Label a model to show energy transfer during cellular respiration.

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B.2.3.a.1	Use visual representations to demonstrate the cycling of matter and flow of energy among organisms in an ecosystem.	Follow the movement of matter and energy through an ecosystem.	Label the movement of matter and energy through an ecosystem.	Illustrate the movement of matter and energy through an ecosystem.
B.2.4.a.1	Describe the role of photosynthesis and cellular respiration in the carbon cycle.	Recognize that photosynthesis and cellular respiration are processes.	Recognize that photosynthesis and cellular respiration are part of the carbon cycle.	Label a model of the carbon cycle with photosynthesis and cellular respiration.
B.4.2.a.1	Explain how the structure of DNA determines the structure of proteins that carry out essential functions of life through systems of specialized cells.	Recognize the structure of DNA (sequence of nucleotides).	Recognize that the structure of DNA (sequence of nucleotides) creates protein.	Describe transcription and translation. (e.g. know the central dogma: DNA --> RNA --> Protein)
B.4.3.a.1	Model the primary structure of protein as determined by the sequence of its amino acids and DNA codes.	Recognize the primary structure of a protein.	Recognize that the primary structure of proteins are amino acids.	Model the steps of transcription and translation using a codon ring. (e.g. DNA --> RNA --> Protein)
B.4.4.a.1	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Recognize that mitosis is a process of cellular division.	Label the model of mitosis.	Use a model to demonstrate the steps of mitosis and define differentiation.
SEPS.2	Developing and using models that illustrate ideas and explanations. Identify and correctly use tools to construct, obtain, and evaluate questions and problems.	Recognize that models and tools can be used to explain scientific processes.	Use already developed models and tools to explain scientific processes.	Develop and use models and tools to explain scientific processes.