Pennsylvania Keystone Biology Performance Level Descriptors

Basic	Proficient	Advanced
A student performing at the **Basic Level** demonstrates partial command of the knowledge, skills, and practices defined in the Pennsylvania Academic Standards for the tested grade(s). This level of performance is considered marginal, indicating that the student is approaching but not yet meeting expectations and may require targeted academic support, either occasional or ongoing, for the student to participate in and keep up with grade-level instruction in the next school year.	A student performing at the **Proficient Level** demonstrates adequate command of the knowledge, skills, and practices defined in the Pennsylvania Academic Standards for the tested grade(s) and meets expectations. This level of performance is considered satisfactory, indicating that the student is academically prepared to participate in and keep up with grade-level instruction in the next school year when provided with Tier 1 instruction.	A student performing at the **Advanced Level** demonstrates thorough command of the knowledge, skills, and practices defined in the Pennsylvania Academic Standards for the tested grade(s) and exceeds expectations. This level of performance is considered superior, indicating that the student is academically prepared for grade level instruction in the next school year, including challenging content.
A student at this level is able to do the following:	**A student at this level is able to do the following:**	**A student at this level is able to do the following:**
• identify that DNA is responsible for specific proteins.	• construct an explanation of how specific proteins result in specific specialized cells using data (e.g., data table of gene regulation/ genes marked as "on" or "off") for specific cellular proteins and corresponding cell types.	• predict which proteins a specialized cell would contain (given information in a scenario).
• use a model to identify component parts of a system in a multicellular organism.	• illustrate the relationship between component parts of a system (e.g., using a model of a body system, showing the interaction of organs within a body system) or between one system and another system (e.g., interaction between body systems).	• illustrate the relationship a part of a system has both with another component part of its system (e.g., using a model of a body system, showing the interaction of organs within a body system) and with another system (e.g., using interactions between body systems).
• identify a mechanism for negative feedback to maintain homeostasis.	• plan an investigation (body temperature, heart rate, oxygen vs carbon dioxide production, stomata opening and closing) for negative feedback mechanisms to maintain homeostasis.	• evaluate the outcome of an investigation for negative feedback mechanisms to maintain homeostasis.
• identify a model to explain the relationship of cell division and differentiation in the development of the multicellular organism.	• use a simple model to explain the relationship of cell division and differentiation for early development of the multicellular organism to illustrate the growth, repair, and maintenance of the organism (e.g., plant, animals).	• revise a simple model to explain the relationship of cell division and differentiation for early development of the multicellular organism to illustrate the growth, repair, and maintenance of an organism (e.g., plants, animals).
• identify the model representing photosynthesis.	• model and illustrate the transformation of light energy into chemical energy in the process of photosynthesis.	• develop an investigation designed to collate data on the effect of light on the growth rate of photosynthetic organisms.
• identify macromolecules containing carbon (C), hydrogen (H), and oxygen (O).	• explain that the carbon-based molecules within their bodies come from the C, H, and O in the sugars they eat.	• evaluate and explain the chemical processes involved in the formation and conversion of macromolecules. (e.g., hydrolysis, dehydration synthesis, condensation).
• label the inputs and outputs of cellular respiration.	• develop a model to show that cellular respiration is a chemical process that involves the breaking and making of bonds resulting in a net transfer of energy.	• model the making and breaking of bonds and transfer of energy in cellular respiration (e.g., equation, diagram) and explain the conservation of matter and energy.
• identify the amount or types of matter or energy at various levels in a food web.	• compare the inputs (both matter and energy) and outputs of photosynthesis and cellular respiration.	• use multiple pieces of mathematical evidence to explain 1) that matter is conserved and cycled in an ecosystem and that 2) energy flows through a food web leading to fewer numbers as you move up through a food web.

As approved by the State Board of Education on September 10, 2026

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• identify the carrying capacity for a population within an ecosystem.	• identify the carrying capacity for a population and propose factors that affect the size of the population.	• analyze the carrying capacity for a population and predict how carrying capacity would change in different circumstances.
• identify the inputs and outputs of photosynthesis, aerobic respiration and anaerobic respiration using diagrams showing the stages of each reaction.	• use diagrams showing the inputs and outputs, including ATP, of photosynthesis, aerobic respiration, and anaerobic respiration to compare the amount of energy produced.	• use diagrams showing the inputs and outputs, including ATP, of photosynthesis, aerobic respiration, and anaerobic respiration to compare the energy produced and how materials are cycled in the environment.
• identify the parts of a model that illustrate the cycling of carbon using photosynthesis and cellular respiration.	• develop a model that illustrates the cycling of carbon using photosynthesis and cellular respiration.	• develop a model that illustrates the cycling of carbon using photosynthesis and cellular respiration to make predictions regarding carbon cycling imbalances.
• identify factors that affect population growth and biodiversity.	• analyze community population data before and after a significant environmental event to determine population dynamics.	• analyze community population data before and after a significant environmental event to investigate population dynamics and predict factors that will affect populations.
• identify how the numbers and types of organisms will change based on the conditions and stability of the ecosystem.	• analyze how the numbers and types of organisms will change based on the conditions and stability of the ecosystem.	• predict how numbers and types of organisms will change based on the conditions and stability of the ecosystem.
• identify a solution for reducing the effects of human activities on native species.	• evaluate a solution for reducing the effects of human activities (e.g., urbanization, invasive species, agriculture) on native species.	• design a solution for reducing the effects of human activities on native species.
• identify that certain group behaviors help support survival.	• observe and evaluate a species' individual reproductive success as it pertains to their role/lifestyle of living within a group and being a part of that group's behavior.	• defend their evaluation of group behavior allowing for individual reproductive success through a sample of anecdotal evidence.
• identify examples that DNA is passed from parent to offspring.	• clarify the relationship between a gene and its chromosome allowing for the understanding of DNA being passed from parent to offspring.	• construct an understanding that extends beyond the gene/chromosome/inheritance relationship into the realm of acknowledging that every cell contains the same genetic code, but the particular genes expressed play different roles as they are passed down from generation to generation.
• identify that inheritable traits can vary from parent to offspring.	• explain that genetic variation is a result of crossing over in meiosis, replication errors, and/or mutations caused by environmental factors.	• interpret evidence to distinguish the source of genetic variations, be it through meiosis, replication error or environmental factors.
• use given data to identify the variation and distribution of traits in the population.	• use given data to infer how the variation and distribution of traits will be represented in the population.	• analyze given data to explain how the variation and distribution of traits are represented in a population.
• identify a line of evidence that communicates common ancestry and biological evolution.	• compare lines of evidence (e.g., fossil record, similarities in DNA sequences, amino acid sequences, anatomical structure, and order of appearance of structures in embryological development) to communicate common ancestry and biological evolution.	• develop a logical environment, citing lines of evidence to communicate common ancestry and biological evolution.
• identify which factor is influencing the evolution of a species, in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species.	• use data (e.g., mathematical models, simple distribution graphs) from a sample population to describe which factor is influencing the evolution of a species. (i.e., number of organisms, behaviors,	• analyze and interpret data from a sample population to compare multiple factors influencing the evolution of a species in terms of ability

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	morphology, physiology) in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species.	to compete for limited resources and subsequent survival of individuals and adaptation of species.
• choose where to build a new building with the least impact to biodiversity based on given environmental scenarios.	• choose and support where to build a new building with the least impact to biodiversity based on given environmental scenarios.	• design a building plan for the lowest human impact on biodiversity based on a given scenario.
• use a scenario and data set to identify a single piece of evidence that supports the theory of natural selection (fitness level) promoting change(s) in populations.	• use a scenario and data set to construct an explanation based on a piece of evidence (e.g., evidence of evolution, population numbers, gene frequency) and correlating ecological factor(s) (e.g., pH levels, light, geographic barriers, temperature, seasonal patterns, shifts in climate, other organisms) and explain how natural selection (fitness level) provides a mechanism for adaptation(s) in populations.	• use a scenario and data set to construct an explanation using multiple pieces of evidence and correlating ecological factors and explain how natural selection (fitness level) provides a mechanism for adaptation(s) in populations.
• identify a single environmental change that may increase population numbers in a species, promote the emergence of a new divergent species over time, and the extinction of other species.	• use multiple pieces of evidence to support a claim on and how an environmental change (e.g., deforestation, chemicals/pollution, drought, fishing/hunting, rate of environmental change) may increase population numbers in a species, promote the emergence of a new divergent species over time, and the extinction of other species.	• use evidence to revise a claim on how environmental changes may increase population numbers in a species, promote the emergence of a new divergent species over time, and the extinction of other species.