

SCIENCE PERFORMANCE LEVEL DESCRIPTORS - BIOLOGY

ADVANCED

A student performing at Advanced effectively, consistently, and appropriately applies science and engineering practices to explain phenomena and design solutions to problems in the natural and the designed world. The student uses information to evaluate patterns in data and revise models that support scientific claims, explain relationships among variables, and predict, based on scientific principles and reasoning, how the variables will change over time. The student revises the design of investigations in order to collect data that can describe quantitative relationships among variables. The student analyzes patterns in data to determine which solution best meets the criteria and constraints of a problem. The student uses data, mathematical and computational thinking, and scientific principles to construct explanations of scientific processes and arguments about stability and change within systems.

PROFICIENT

A student performing at Proficient effectively applies science and engineering practices to explain phenomena and design solutions to problems in the natural and the designed world. The student develops models and uses information and patterns in data to support scientific arguments, describe relationships among variables, and predict how the variables will change over time. The student plans investigations to determine proportional relationships among variables. The student analyzes patterns in data to evaluate how well a solution meets the criteria and constraints of a problem. The student uses data, mathematical and computational thinking, and scientific principles to construct explanations of scientific processes and arguments about how systems and system parts will change over time.

BASIC

A student performing at Basic applies, with support, science and engineering practices to explain phenomena and design solutions to problems in the natural and the designed world. The student uses models, information, and patterns in data to support scientific arguments, identify the relationship between two variables, and make predictions about how changes to one variable will affect other variables. The student describes the data to collect in an investigation in order to identify proportional relationships among variables. The student uses patterns in data to identify a solution that meets given criteria and constraints of a problem. The student uses data, basic algebraic thinking, and scientific principles to support explanations of scientific processes and arguments about how systems and system parts will change over time.

BELOW BASIC

A student performing at Below Basic seldom applies science and engineering practices to explain phenomena and design solutions to problems in the natural and the designed world. The student occasionally identifies models, information, and patterns in data to describe relationships between two variables and make predictions about how changes to one variable will affect other variables. The student infrequently recognizes trends in the data collected during an investigation in order to identify the relationships among variables. The student can sometimes use patterns in data to identify a solution to a problem. The student occasionally uses data and basic algebraic thinking to explain how systems and system parts change over time.

SCIENCE PERFORMANCE LEVEL DESCRIPTORS - BIOLOGY

Life Science	Below Basic A student who has reached the level of <i>Below Basic</i> level is to successfully address some, but not all, of the following:	Basic A student who has reached the level of <i>Basic</i> is able to successfully address some, but not all, of the following:	Proficient A student who has reached the level of <i>Proficient</i> is able to successfully address some, but not all, of the following:	Advanced A student who has reached the level of <i>Advanced</i> is able to successfully address some, but not all, of the following:
From Molecules to Organisms: Structure and Processes	Recognize that DNA controls specialized cell functions.	Identify evidence of how DNA sequences relate to specialized cell functions	Use evidence to describe how DNA sequences relate to specialized cell functions.	Collect and evaluate evidence to explain how DNA sequences relate to specialized cell functions.
	Identify how interacting cells or organs provide specific functions	Identify a model showing interacting cells or organs provide specific functions.	Use models to explain how interacting cells or organs provide specific functions.	Use models and evidence to explain how interacting cells or organs provide specific functions.
	Observe life functions that rely upon homeostasis.	Use data to identify how life functions rely upon homeostasis.	Investigate how life functions rely upon feedback mechanisms in homeostasis.	Investigate and evaluate evidence of how life functions rely upon feedback mechanisms in homeostasis.
	Recognize the process of mitosis, cellular division, or differentiation.	Identify a model to describe the process of mitosis, cellular division, or differentiation in producing and maintaining complex organisms.	Develop or use a model to explain the process of mitosis, cellular division, or differentiation in producing and maintaining complex organisms.	Evaluate two models for which better explains the process of mitosis, cellular division, or differentiation in producing and maintaining complex organisms.
	Recognize a model of photosynthesis that transforms light energy into chemical energy.	Identify a model to describe photosynthesis transforms light energy into chemical energy.	Use a model to explain with evidence photosynthesis transforms light energy into chemical energy.	Analyze or evaluate a model to explain photosynthesis transforms light energy into chemical energy.
	Recognize a model of cellular respiration breaks down molecules resulting in a net transfer of energy.	Identify a model to describe cellular respiration breaks down molecules resulting in a net transfer of energy.	Use a model to explain with evidence cellular respiration breaks down molecules resulting in a net transfer of energy.	Analyze or evaluate a model to explain cellular respiration breaks down molecules resulting in a net transfer of energy.

SCIENCE PERFORMANCE LEVEL DESCRIPTORS - BIOLOGY

	Identify or recognize an explanation of macromolecule composition.	Revise an explanation of macromolecule composition.	Create and revise an explanation of macromolecule composition.	Evaluate an explanation and provide evidence of macromolecule composition.
Ecosystems: Interactions, Energy, and Dynamics	Describe the transformation in plants of light into chemical energy.	Identify a model to describe the transformation in plants of light into chemical energy.	Use models to explain the transformation in plants of light into chemical energy.	Use models and data to explain the transformation in plants of light into chemical energy.
	Describe how matter and energy found in food molecules are used in organisms.	Identify a model to describe how matter and energy found in food molecules are used in organisms.	Use models to explain how matter and energy found in food molecules are used in organisms.	Evaluate models that explain how matter and energy found in food molecules are used in organisms.
	Describe the biological processes that cycle carbon and energy within Earth systems.	Identify a model of the biological processes that cycle carbon and energy within Earth systems	Model the biological processes that cycle carbon and energy within Earth systems.	Collect evidence to model the biological processes that cycle carbon and energy within Earth systems.
	Explain factors affecting biodiversity of ecosystem populations.	Identify data to describe factors affecting biodiversity of ecosystem populations.	Use mathematical representations to explain factors affecting biodiversity and ecosystem populations.	Analyze data and use mathematical representations to explain factors affecting biodiversity and ecosystem populations.
	Describe physical or biological changes that affect ecosystem conditions and stability.	Identify evidence to describe physical or biological changes that affect ecosystem conditions and stability.	Evaluate evidence of complex physical or biological changes that affect ecosystem conditions and stability.	Gather, analyze and evaluate evidence of complex physical or biological changes that affect ecosystem conditions and stability.
	Explain how to minimize human impacts on the environment and biodiversity.	Identify a design that minimizes human impacts on the environment and biodiversity.	Evaluate designs that minimize human impacts on the environment and biodiversity.	Evaluate and communicate designs that minimize human impacts on the environment and biodiversity.
	Heredity: Inheritance and Variation of Traits	Recognize differences in the complexity of organisms caused by cellular divisions.	Use models to describe differences in the complexity of organisms caused by cellular divisions.	Construct a model to explain differences in the complexity of organisms caused by cellular divisions.

SCIENCE PERFORMANCE LEVEL DESCRIPTORS - BIOLOGY

	Describe similarities and differences of asexual and sexual reproduction.	Identify a model to describe variation in organisms as a result of asexual or sexual reproduction.	Use a model to explain variation in organisms as a result of asexual or sexual reproduction.	Evaluate a model to explain variation in organisms as a result of asexual or sexual reproduction.
	Identify a claim about the causes of inheritable genetic variation.	Make a claim about the causes of inheritable genetic variation.	Use evidence to make and defend a claim about the causes of inheritable genetic variation.	Evaluate evidence to make and defend a claim about the causes of inheritable genetic variation.
	Recognize DNA data to describe genetic variation in individuals in a population.	Use DNA data to describe genetic variation in individuals in a population.	Use DNA data to defend a claim with evidence for the cause of genetic variation in individuals and in populations.	Use DNA data to evaluate evidence for the cause of genetic variation in individuals and in populations.
	Recognize the probability of a trait in a population.	Perform mathematical functions to determine probability of a trait in a population.	Use a model to explain the variation and distribution of traits in a population.	Use a model to explain and predict variation and distribution of traits in a population as they relate to genetic and environmental factors.
Biological Evolution: Unity and Diversity	Describe common ancestry and biological evolution.	Identify a model to describe common ancestry and biological evolution.	Use a model to explain common ancestry and biological evolution.	Evaluate models to determine which best explains common ancestry and biological evolution.
	Identify similarities in embryological development across multiple species.	Describe similarities in embryological development across multiple species.	Use pictorial data to explain similarities in embryological development across multiple species.	Analyze pictorial data to explain relationships in similarities evident in embryological development across multiple spaces.
	Explain ecological and genetic factors related to evolutionary processes.	Identify evidence to describe ecological and genetic factors related to evolutionary processes.	Use evidence to explain that ecological and genetic factors result in evolutionary processes.	Evaluate evidence for ecological and genetic factors result in evolutionary processes.
	Predict the likelihood of an organism with advantageous heritable characteristic will increase.	Use data to describe the likelihood of an organism with advantageous heritable characteristic will increase.	Use a mathematical model to explain the likelihood of an organism with advantageous heritable characteristic will increase.	Evaluate a mathematical model to explain the likelihood of an organism with advantageous heritable characteristic will increase.

SCIENCE PERFORMANCE LEVEL DESCRIPTORS - BIOLOGY

	Explain the adaptation of populations through natural selection.	Identify evidence to describe the adaptation of populations through natural selection.	Use evidence to support the adaptation of populations through natural selection.	Use models and evidence to support the adaptation of populations through natural selection.
	Recognize evidence of environmental changes that affect species populations over time.	Use evidence to describe environmental changes that affect species populations over time.	Evaluate evidence that environmental changes affect species populations over time.	Collect and evaluate evidence that environmental changes affect species populations over time.
	Recognize a solution to negative effects of human impact on biodiversity.	Use a model to describe a solution to negative effects of human impact on biodiversity.	Create a model to explain a solution to negative effects of human impact on biodiversity.	Revise or evaluate a model to explain a solution to negative effects of human impact on biodiversity.

SCIENCE PERFORMANCE LEVEL DESCRIPTORS - BIOLOGY

Earth and Space Science	Below Basic A student who has reached the level of <i>Below Basic</i> level is to successfully address some, but not all, of the following:	Basic A student who has reached the level of <i>Basic</i> is able to successfully address some, but not all, of the following:	Proficient A student who has reached the level of <i>Proficient</i> is able to successfully address some, but not all, of the following:	Advanced A student who has reached the level of <i>Advanced</i> is able to successfully address some, but not all, of the following:
Earth's Systems	Identify an example of coevolution of Earth's systems and life on Earth.	Identify an argument based on evidence to describe coevolution of Earth's systems and life on Earth.	Construct an argument based on evidence to describe coevolution of Earth's systems and life on Earth.	Analyze or evaluate an argument to explain coevolution of Earth's systems and life on Earth.
Earth and Human Activity	Describe the effects of natural resources or natural hazards on human activity.	Identify evidence within a model to describe the effects of natural resources or natural hazards on human activity.	Use a model to explain the effects of natural resources or natural hazards on human activity.	Develop, analyze or evaluate a model from evidence to explain the effects of natural resources or natural hazards on human activity.
	Recognize the impacts of human use of natural resources.	Describe evidence of the impacts of human use of natural resources.	Evaluate the cost-benefit design solutions for the use of natural resources.	Evaluate and optimize the cost-benefit design solutions for the use of natural resources.
	Identify a relationship among the management of natural resources, human population sustainability, and biodiversity.	Describe the relationship among the management of natural resources, human population sustainability, and biodiversity.	Develop a simulation to illustrate the relationship among the management of natural resources, human population sustainability, and biodiversity.	Evaluate or refine a simulation to illustrate the relationship among the management of natural resources, human population sustainability, and biodiversity.
	Identify a solution that reduces human impacts on natural systems.	Describe evidence of a solution that reduces human impacts on natural systems.	Evaluate a solution that reduces human impacts on natural systems.	Evaluate, refine, and communicate solutions that reduces human impacts on natural systems.
	Describe how human activity affects Earth Systems	Identify evidence within a model to describe how human activity affects Earth Systems	Use a model to predict how human activity affects Earth Systems.	Develop, analyze or evaluate a model from evidence to predict how human activity affects Earth Systems.

SCIENCE PERFORMANCE LEVEL DESCRIPTORS - BIOLOGY

Engineering and Technology Science	Below Basic A student who has reached the level of <i>Below Basic</i> level is to successfully address some, but not all, of the following:	Basic A student who has reached the level of <i>Basic</i> is able to successfully address some, but not all, of the following:	Proficient A student who has reached the level of <i>Proficient</i> is able to successfully address some, but not all, of the following:	Advanced A student who has reached the level of <i>Advanced</i> is able to successfully address some, but not all, of the following:
Engineering Design	Recognize criteria or constraints for solutions to a major global challenge.	Specify/describe criteria and constraints for solutions to a major global challenge that account for societal needs and wants.	Analyze criteria and constraints for solutions to a major global challenge that account for societal needs and wants.	Evaluate criteria and constraints for solutions to a major global challenge that account for societal needs and wants.
	Recognize an engineering problem.	Identify that engineering problems can be broken down into smaller problems.	Design solutions to smaller problems in the context of a larger problem.	Evaluate solutions to smaller problems in the context of a larger problem.
	Identify the needs or trade-offs of an engineering design.	Identify the needs and trade-offs of an engineering design.	Use prioritized needs and trade-offs of an engineering design to evaluate a complex, real-world problem.	Use prioritized needs and trade-offs of an engineering design to optimize a solution to a complex, real-world problem.
	Identify a solution to a design problem.	Identify the most appropriate solution to a design problem.	Use models to explain the most appropriate solution to a design problem.	Evaluate models to argue for the most appropriate solution to a design problem.