SCIENCE PERFORMANCE LEVEL DESCRIPTORS – EARTHA AND SPACE SCIENCE

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.

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Earth and Space Science	**Below Basic** A student who has reached the level of *Below Basic* level is to successfully address some, but not all, of the following:	**Basic** A student who has reached the level of *Basic* is able to successfully address some, but not all, of the following:	**Proficient** A student who has reached the level of *Proficient* is able to successfully address some, but not all, of the following:	**Advanced** A student who has reached the level of *Advanced* is able to successfully address some, but not all, of the following:
Earth's Place in the Universe	Identify the relationship between star properties and released energy.	Describe the relationship between star properties and released energy.	Develop a model to explain the relationship between star properties and released energy.	Use evidence and models to explain the relationship between star properties and released energy.
	Identify the big bang theory.	Summarize the big bang theory.	Use astronomical evidence to support the big bang theory.	Synthesize astronomical evidence to support the big bang theory.
	Identify changes in stars over time.	Describe how stars change over their lifetime.	Explain scientific ideas around stars producing elements.	Evaluate and communicate evidence of how stars produce elements over their life cycle.
	Identify the present orbital motions of objects in the solar system.	Describe the present orbital motions of objects in the solar system.	Use mathematical representations to predict orbital motions of objects in the solar system.	Use mathematical representations and models to explain predictions of orbital motions of objects in the solar system.
	Describe the idea that continental rocks are generally older than rocks on the ocean floor.	Identify evidence from multiple sources to support that continental rocks are generally older than rocks on the ocean floor.	Describe evidence from multiple sources to support that continental rocks are generally older than rocks on the ocean floor.	Evaluate evidence from multiple sources to argue that continental rocks are generally older than rocks on the ocean floor.
	Identify the formation of Earth and its early history.	Describe the formation of Earth and its early history.	Use evidence to explain the formation of Earth and its early history.	Analyze and evaluate evidence to explain the formation of Earth and its early history.
Earth's Systems	Identify that Earth's surface are a result of constructive forces.	Describe how Earth's interior and surface processes operate.	Construct a model to illustrate Earth's interior and surface processes operate.	Evaluate or refine a model to illustrate Earth's interior and surface processes operate.
	Identify an example of a change in Earth's surface that has caused changes to other Earth systems.	Describe a change in Earth's surface can cause changes to other Earth systems.	Use data to support a claim that a change in Earth's surface can cause changes to other Earth systems.	Analyze data to construct a claim that a change in Earth's surface can cause changes to other Earth systems.
	Identify tectonic-plate movements that describe the relative ages of different materials on Earth.	Use tectonic-plate movements to describe the relative ages of different materials on Earth.	Use tectonic-plate movements to evaluate evidence for the ages of different materials on Earth.	Use tectonic-plate movements and models to evaluate evidence for the ages of different materials on Earth.

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	Identify data used to describe Earth's formation or early history.	Identify and describe data used to summarize Earth's formation or early history.	Use physical evidence to explain Earth's formation or early history.	Use physical evidence to support an argument about Earth's formation or early history.
	Identify physical processes on Earth's surface and within earth that shape Earth's features over time and space.	Describe how physical processes on Earth's surface and within earth shape Earth's features over time and space.	Use models to explain how physical processes on Earth's surface and within earth shape Earth's features over time and space.	Use models and data to explain how physical processes on Earth's surface and within earth shape Earth's features over time and space.
	Identify an example of how water has affected Earth's materials.	Describe properties of water and their effects on Earth's materials.	Investigate properties of water and its effects on Earth materials.	Use evidence from an investigation to describe how water affects Earth's materials and surfaces processes.
	Describe the cycling of carbon between two levels.	Explain the cycling of carbon among four levels.	Make a model to describe the cycling of carbon among four levels.	Evaluate and refine a model to describe the cycling of carbon among four levels.
	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.
	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 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.

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	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 an example of climate change.	Describe a change in precipitation and temperature and their associated impacts.	Use data to provide evidence for the current rate of climate change.	Analyze data to provide evidence for the current rate of climate change and the associated future impacts of Earth 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.

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Engineering and Technology Science	**Below Basic** A student who has reached the level of *Below Basic* level is to successfully address some, but not all, of the following:	**Basic** A student who has reached the level of *Basic* is able to successfully address some, but not all, of the following:	**Proficient** A student who has reached the level of *Proficient* is able to successfully address some, but not all, of the following:	**Advanced** A student who has reached the level of *Advanced* 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.