

High School Achievement Level Descriptors (ALDs)

High School				
Students who are a level _____ may be able to do things like....	1	2	3	4
Earth Science				
ESS1: Earth's Place in the Solar System	Identify components and limitations of a model that uses mathematical representations to explain the characteristics, processes and life cycles of objects in the solar system; and identify and critique evidence that shows the motion of objects in our solar system and Earth's early formation and geologic history.	Use existing mathematical concepts and processes to explain algorithms and models that explain the characteristics, processes, and life cycles of objects in the solar system; and construct an explanation, which uses the relationship between different variables, for the motion of objects in our solar system and Earth's early formation and geologic history.	Develop and/or use mathematical models to collect data and explain the characteristics, processes, and life cycles of objects in the solar system; and construct an explanation based on qualitative and quantitative evidence for the motion of objects in our solar system and Earth's early formation and geologic history.	Evaluate and revise a mathematical model to make predictions regarding the characteristics, processes, and life cycles of objects in the solar system; and construct and revise an explanation based on evidence, scientific theories and laws for the motion of objects in our solar system and Earth's early formation and geologic history.

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<p>ESS2: Earth's Systems</p>	<p>Identify components and limitations of a model or investigation, including mathematical algorithms and computations, to show that energy flows into and out of one Earth system and how energy flow can cause feedback effects to occur with other Earth systems, specifically with the planet's interactions with water, solar radiation, geologic systems, and climate.</p>	<p>Conduct an investigation or use an existing model, including mathematical algorithms and computations, to show that energy flows into and out of one Earth system, and how energy flow can cause feedback effects with other Earth systems, specifically with the planet's interactions with water, solar radiation, geologic systems, and climate.</p>	<p>Develop and/or use a model to generate and use quantitative data from an investigation to analyze and use as evidence as support that variations in energy flow into or out of Earth systems will cause feedback effects with other Earth systems, specifically with the planet's interactions with water, solar radiation, geologic systems, and climate.</p>	<p>Evaluate and/or revise an investigation or computational model to predict changes that can occur to the Earth's feedback mechanisms when a variable is either added or changed; and analyze the collected data by applying concepts of statistics and probability to show how energy flow into or out of an Earth system, specifically with the planet's interactions with water, solar radiation, geologic systems and climate, affect those feedback effects.</p>
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ESS3: Earth and Human Activity	Identify and construct graphical displays of data that can be used to explain how human activity has been influenced by the availability of natural resources, natural hazards, and climate change; and use mathematical representations and/or algorithms to identify the impact of climate change on Earth’s systems and human society and how human society has impacted the Earth's systems.	Use data from graphical displays to support a claim that human activity has been influenced by the availability of natural resources, natural hazards, and climate change; and use a computational simulation or model to identify the rate of climate change and its impact on Earth’s systems and human society to observe relationships for how human society has impacted the Earth's systems.	Evaluate data and construct an explanation for how human activity has been influenced by the availability of natural resources, natural hazards, and climate change; and mathematically analyze information from natural resource data with a computaional simulation or representation of climate models to predict the rate of climate change and its impact on Earth’s systems and human society to illustrate relationships for how human society has impacted the Earth's systems.	Use mathematical thinking to evaluate and/or revise an explanation for how human activity has been influenced by the availability of natural resources, natural hazards, and climate change; and create a a computational simulation or representation to natural resource data and climate models to use relationships to predict the rate of climate change and its impact on Earth’s systems and human society and how human society has impacted the Earth's systems.

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Life Science				
LS1: From Molecules to Organisms: Structure and Processes	Identify the relationships between variables that contribute to the feedback mechanisms that maintain homeostasis through the structure, function, and processes of living systems; and identify the components and limitations of a model that can be used to support an explanation for how cellular respiration moves energy and matter through the body, forming different products, transferring energy, and replicating DNA and protein synthesis.	Conduct an investigation to collect data which will serve as evidence for a model that shows that feedback mechanisms maintain homeostasis through the structure, function, and processes of living systems; and use collected data to support a claim regarding how cellular respiration moves energy and matter through the body, forming different products, transferring energy, and replicating DNA and protein synthesis.	Plan and conduct an investigation and develop and use a model to show that feedback mechanisms maintain homeostasis through the structure, function, and processes of living systems; and evaluate data from an investigation to construct an explanation for cellular respiration moves energy and matter through the body, forming different products, transferring energy, and replicating DNA and protein synthesis.	Plan and conduct an investigation and evaluate and revise a model to explain what happens to the feedback mechanisms that maintain homeostasis through the structure, function, and processes of living systems when a variable is changed; and apply scientific reasoning, theory and/or models to make and support a claim that cellular respiration moves energy and matter through the body, forming different products, transferring energy, and replicating DNA and protein synthesis.

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<p>LS2: Ecosystems: Interactions, Energy, and Dynamics</p>	<p>Use mathematical representations to identify components or variables in the cycling and flow of matter and energy among organisms in an ecosystem; and identify evidence that supports the interactions with biotic and abiotic factors in ecosystems help maintain the population and diversity of organisms.</p>	<p>Use mathematical representations to construct an explanation with data that shows how energy and matter flow and cycle among organisms in an ecosystem; evaluate and identify patterns seen in data that can be used as evidence to explain the interactions of biotic and abiotic factors in maintaining the population and diversity of organisms in an ecosystem; and identify disturbances in conditions; biological, physical, or human induced, that may result in a new ecosystem.</p>	<p>Create and/or use mathematical, computational and algorithmic representations to support claims about the cycling of matter and flow of energy among organisms in an ecosystem; and use evidence and reasoning to construct an explanation for how interactions with biotic and abiotic factors in ecosystems maintain the population and diversity of organisms, but that disturbances in conditions; biological, physical or human induced, may result in a new ecosystem.</p>	<p>Evaluate and revise a computational model or simulation that can explain that the cycling of matter and flow of energy among organisms in an ecosystem can be disturbed when a new variable is introduced; use mathematical and computational evidence to argue that interactions with biotic and abiotic factors in ecosystems maintain the population and diversity of organisms; and predict how an ecosystem might change with a disturbance in conditions; biological, physical or human induced.</p>
<p>LS3: Heridity: Inheritance and Variation of Traits</p>	<p>Identify an observation or model of DNA, chromosomes, and traits; and use graphical displays of data to identify evidence which supports a claim about genetic and environmental factors that may affect the variation and distribution of traits in a population.</p>	<p>Ask a question that requires sufficient, empirical evidence to answer regarding the relationship of DNA, Chromosomes, and traits; and analyze data to support a claim defending an argument about genetic and environmental factors and their effect on variation within a population.</p>	<p>Analyze a model or theory in order to ask a question which determines the relationship between the role of DNA and chromosomes, and traits; and apply concepts of statistics and probability when analyzing evidence in order to make and defend a claim about genetic and environmental factors that may affect the variation and distribution of traits in a population.</p>	<p>Use a question to analyze and evaluate the relationship between the role of DNA and chromosomes, and traits; and apply concepts of statistics and probability when analyzing evidence in order to predict the variation and distribution of traits in population when a genetic and environmental factor is changed.</p>

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LS4: Biological Evolution: Unity and Diversity	Identify and use genetic and anatomical evidence obtained from texts and mathematical representations to support that the evolution, extinction, and formation of new species is based on different environmental factors; and identify causal and correlational relationships of environmental conditions and population adaptations.	Construct and/or use graphical displays of data to provide genetic and anatomical evidence for how given factors have resulted in diversity through evolution, extinction, and formation of new species; and analyze data to distinguish between causal and correlational relationships to support that environmental conditions can lead to adaptations within populations.	Use genetic and anatomical information obtained from texts, mathematical, computational, and/or algorithmic representations to construct an explanation for how given factors have resulted in diversity through evolution, extinction, and formation of new species; and generate and analyze mathematical data to support the argument that environmental conditions can lead to adaptations within populations.	Use genetic and anatomical information obtained from texts and/or mathematical, computational and/or algorithmic representations to evaluate and revise an explanation to predict what would happen to a current species when a given factor is changed; and predict and support the adaptations a population may experience when environmental conditions are changed.
Physical Science				
PS1: Matter and Its Interactions	Recognize the patterns in the periodic table and identify variables and limitations of a model that provides an explanation for the properties and characteristics of matter; and apply mathematical concepts to an investigation that produces data to identify evidence for an explanation that any chemical process that occurs between matter is due to a collision of molecules, change in energy, and atom configuration of the elements involved.	Use the periodic table to develop a model of atomic structure, including simple computations and algorithms, to provide an explanation for the properties and characteristics of matter; and collect data from an investigation that can be analyzed for patterned evidence to support the claim that any chemical process that occurs between matter is due to a collision of molecules, change in energy, and atom configuration of the elements involved.	Use the periodic table, subatomic structures, and corresponding electrical interactions to construct an investigation and/or mathematical model that explains the properties and characteristics of matter; and provide quantitative and qualitative evidence that any chemical processes that occur between matter is due to a collision of molecules, change in energy and atom configuration of the elements involved.	Use the periodic table, subatomic structures, and corresponding electrical interactions to evaluate and/or revise a mathematical model or investigation that predicts the properties and characteristics of matter when a component is changed; and construct and/or revise an explanation that any chemical processes that occur between matter is due to the collision of molecules, change in energy and atom configuration of elements.

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PS2: Motion and Stability: Forces and Interactions	Use mathematical concepts and processes to help identify limitations or components of an investigation that shows the relationship between either force and the distance between interacting objects, or force, mass, and acceleration; and interpret graphical displays of data to identify evidence that supports how an object moves.	Collect and/or produce data to distinguish between causal and correlational relationships between force and the distance between interacting objects, or force, mass, and acceleration; and use mathematical and graphical representations to describe the motion of an object.	Plan and conduct an investigation to collect data to serve as the basis for a model that explains the relationship between either force and the distance between interacting objects, or force, mass, and acceleration; and use mathematical, graphical, and computational analysis to observe patterns to explain changes in the motion of an object.	Evaluate and revise an investigation, or predict changes to an investigative outcome, when a variable is changed when modeling the relationship between either force and the distance between interacting objects, or force, mass, and acceleration; and use scientific ideas, principles and/or evidence to revise an explanation and predict changes in the motion of an object when new information is introduced.
PS3: Energy	Identify components and variables of an investigation to describe how energy transfers within and between systems; and develop and/or use a model to identify evidence that energy is not created nor destroyed, but converted to less useful forms.	Collect and/or use mathematical data from an investigation to serve as the basis for a model that provides evidence of energy transfer within and between systems; and develop and/or use a model to support that energy is not created nor destroyed, but converted into less useful forms.	Develop and/or use a mathematical model, using collected or produced data from an investigation, to describe how energy transfers within and between systems; and provide empirical data supporting that energy is neither created nor destroyed, but converted to less useful forms.	Evaluate and revise a mathematical model, using scientific ideas, principles, theories and/or newly added information or data, to predict how energy transfers within and between systems; and provide quantitative, empirical data supporting that energy is neither created nor destroyed, but converted to less useful forms.

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PS4: Waves and their Applications in Technologies for Information Transfer	Integrate qualitative and quantitative information to identify data that shows the relationship between wavelength, amplitude, and frequency, and other wave phenomena; and use mathematical representations to identify components of energy transfer by waves.	Collect and use quantitative data, hypotheses and/or conclusions to collect and use evidence that shows the relationship between wavelength, amplitude, and frequency, and other wave phenomena; and use mathematics and algorithmic thinking to describe energy transfer by waves.	Analyze technical science information to evaluate a claim regarding the relationship between wavelength, amplitude, and frequency, and other wave phenomena; and create and/or use computational models to explain how energy transfers and the effects on the wave due to the nature of a wave medium.	Evaluate models and technical science information to provide evidence of the relationship between wavelength, amplitude, and frequency, and other wave phenomena; and use mathematical, computational and/or algorithmic produced data to predict the effects on the wave due to the nature of a wave medium.