| **High School** | | | | |
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| Students who are a level _____ may be able to do things like.... | 1 | 2 | 3 | 4 |
| Earth Science | | | | |
| ESS1: Earth's Place in the Universe | 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. |
| ESS2: Earth's Systems | Identify components and limitations of a model or investigation 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. | Conduct an investigation or use an existing model 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. | Develop and/or use a model to generate and use 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. | Evaluate and/or revise an investigation or model to predict changes that can occur to Earth's feedback mechanisms when a variable is either added or changed; **and** analyze the collected data to predict how energy flow into or out of Earth systems will affect other Earth systems, specifically with the planet's interactions with water, solar radiation, geologic systems, and climate. |

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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 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 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 computational 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 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 computational simulation or representation of 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 Earth's systems. |

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| Life Science | | | | |
| LS1: From Molecules to Organisms: Structures 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 synthesizing proteins. | 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 synthesizing proteins. | 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 how cellular respiration moves energy and matter through the body, forming different products, transferring energy, and replicating DNA and synthesizing proteins. | 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 synthesizing proteins. |

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| LS2: Ecosystems: Interactions, Energy, and Dynamics | 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. | 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 biological, physical, or human induced disturbances in conditions that may result in a new ecosystem. | 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 biological, physical, or human induced disturbances in conditions may result in a new ecosystem. | 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 biological, physical, or human induced disturbance in conditions. |
| LS3: Heredity: Inheritance and Variation of Traits | Identify an observation or model of DNA, chromosomes, and traits; and use graphical displays of data to identify evidence that supports a claim about genetic and environmental factors that may affect the variation and distribution of traits in a population. | Ask a question that requires sufficient, empirical evidence to answer regarding the relationships between 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. | Analyze a model or theory and ask questions to determine the relationships between the roles of DNA, chromosomes, and traits; **and** apply concepts of statistics and probability when analyzing evidence to make and defend a claim about genetic and environmental factors that may affect the variation and distribution of traits in a population. | Use a question to analyze and evaluate the relationships between the roles of DNA, chromosomes, and traits; **and** apply concepts of statistics and probability when analyzing evidence to predict the variation and distribution of traits in a population when a genetic and environmental factor is changed. |

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| LS4: Biological 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, mathematical, computational and/or algorithmic representations to evaluate and revise an explanation and predict what would happen to a current species when a given factor is changed; **and** use the generated data to support a prediction of 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 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 the collision of molecules, changes in energy, and the atomic configuration of the elements involved. | Use the periodic table to develop a model of atomic structure to support 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 the collision of molecules, changes in energy, and the atomic configuration of the elements involved. | Use the periodic table, atomic 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 are due to the collision of molecules, changes in energy, and the atomic configuration of the elements involved. | Use the periodic table, atomic 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 are due to the collision of molecules, changes in energy and the atomic 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 neither 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 neither 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** apply empirical data to generate quantitative evidence 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 relationships among wavelength, amplitude, frequency, and other wave features; **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 relationships among wavelength, amplitude, frequency, and other wave features; **and** use mathematics and algorithmic thinking to describe energy transfer by waves. | Analyze technical science information to evaluate a claim regarding the relationships among wavelength, amplitude, frequency, and other wave features; **and** create and/or use computational models to explain how energy transfers and how a wave medium affects the wave. | Evaluate models and technical science information to provide evidence of the relationships among wavelength, amplitude, frequency, and other wave features; **and** use mathematical, computational and/or algorithmic produced data to predict how a change in wave medium would affect a wave. |