Grade 8 OSAS Science Achievement Level Descriptors

	Level 1	Level 2	Level 3	Level 4
Physical Science				
PS1 Matter and its Interactions	Limited to no use of the periodic table to describe properties of matter and refer to it to explain chnges of reaction rates and energy changes as conditions vary.	Use a model to show that the number of atoms does not change during chemical reactions, that particle motion changes when thermal energy is added or removed from a system, and to identify reactants and products in a chemical reaction.	Develop and use models to show that matter is conserved during chemical reactions and to predict changes in particle motion when thermal energy is added or removed. Analyze and interpret patterns in data to determine if a chemical reaction has occurred by means of comparing products and reactants.	Evaluate and revise a model that describes how mass is conserved during chemical reactions and to explain predicted changes in particle motion when thermal energy is added to or removed. Analyze and interpret patterns in data in order to predict the outcomes (products) of a chemical reaction.
PS2 Forces and Motion	Conduct an investigation, using little to no basic algebraic thinking to collect data about net force acting on an object, its mass and its acceleration without describing any relationships.	Describe how data from an investigation could be used as evidence to to support the claim that change in an object's motion depends on its mass and the forces with which it interacts and that some forces have fields that can be mapped.	Conduct an investigation and use collected data to construct an argument that change in an object's motion depends on its mass and the forces with which it interacts and that some forces have fields that can be mapped.	Plan and conduct an investigation to use collected data as evidence to construct an argument that change in an object's motion depends on its mass and the forces with which it interacts and that some forces have fields that can be mapped.
PS3 Energy	Limited to no use of a model and/or little to no description of how energy changes in, or forces acting on, one part of a system and how it affects the other parts of the system.	Use graphical displays of data to describe the relationships of an object's speed and kinetic energy to the object's mass and, and support an argument that when an object's kinetic energy changes by position; energy is transferred to or from the object.	Construct and interpret graphical displays of data that can be used to develop a model to describe the relationships of an object's speed and kinetic energy to the object's mass, and construct an argument that when an object's kinetic energy changes by position, energy is transferred to or from the object.	Construct, interpret, and present graphical displays of data to evaluate and revise a model to describe the relationships of an object's speed and kinetic energy to the object's mass and, to compare and/ or critique and revise an arguments that when an object's kinetic energy changes by position, energy is transferred to or from the object.

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PS4 Waves and their Applications in Technologies for Information Transfer	Limited to no use of mathematical relationships to determine amplitude, frequency, and wave speed and limited to no description of interactions of wave speeds and the medium in which they travel.	Use a mathematical model to describe the relationship between wave characteristics and wave energy and use a model to describe that waves are reflected, absorbed, or transmitted through various materials and describe analog and digital signals.	Use mathematical representations to describe the relationship between wave characteristics and wave energy and develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials and argue that digitized signals are more reliable than analog signals.	Use mathematical representations to support the claim that there is a relationship between wave characteristics and wave energy and evaluate and revise a model to describe that waves are reflected, absorbed, or transmitted through various materials and justify why digitized signals are more reliable than analog signals.
Life Science				
LS1 From Molecules to Organisms: Structures and Processes	Limited to no use of data from an investigation and/or model to support the arguments that all living things are made up of cells; all living things may form sub-systems which are part of the larger systems; characteristic animal behaviors and specialized plant structures affect the probability of growth and/or reproduction; describe the cylcing of matter and flow of energy in organisms.	Use data from an investigation and a model to support the arguments that: all living things are made up of cells; all living things may form sub-systems which are part of larger systems ; characteristic animal behaviors and specialized plant structures affect the probability of growth and/or reproduction; describe the cycling of matter and flow of energy in organisms.	Use data from investigations to develop a model to support the arguments that: all living things are made up of cells; all living things may form sub-systems which are part of larger systems; characteristic animal behaviors and specialized plant structures affect the probability of growth and/or reproduction; describe the cycling of matter and flow of energy in organisms.	Revise and evaluate a model using multiple sets of data to construct arguments that; all living things are made up of cells; all living things may form sub-systems which are part of larger systems; characteristic animal behaviors and specialized plant structures affect the probability of growth and/or reproduction; evaluate a model to describe the cycling of matter and flow of energy in organisms.
LS2 Ecosystems: Interactions, Energy, and Dynamics	Limited to no use of a model to identify the dynamic relationships between the diverse types of living and nonliving parts of an ecosystem, which includes the flow of energy and the cycling of matter; little to no use of data to describe how those relationships can affect human access to natural resources.	Use a model to identify the dynamic relationships between the diverse types of living and nonliving parts of an ecosystem, which includes the flow of energy and the cycling of matter; describe how changes in biodiversity can affect human access to natural resources.	Develop and use a model to describe the dynamic relationships between the diverse types of living and nonliving parts of an ecosystem, which includes the flow of energy and the cycling of matter; analyze data and interpret data to determine how changes in biodiversity can affect human access to natural resources.	Evaluate strengths and limitations of a model to analyze the dynamic relationships between the diverse types of living and nonliving parts of an ecosystem which includes the flow of energy and the cycling of matter; analyze and interpret data to explain/predict how those changes in biodiversity could affect human access to natural resources in the future.

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Life Science (con't)				
LS3 Heredity: Inheritance and Variation of Traits	Inaccurately uses a model to describe why sexual or asexual reproduction have different results in genetic variation of offspring and why structural changes to genes (mutations) affect the structure and function of an organism.	Use a model to describe why sexual or asexual reproduction have different results in genetic variation of offspring and why structural changes to genes (mutations) affect the structure and function of an organism.	Develop and use a model to describe why sexual or asexual reproduction have different results in genetic variation of offspring and why structural changes to genes (mutations) affect the structure and function of an organism.	Compare multiple models which describe how both sexual and asexual reproduction have different results in genetic variation and why structural changes to genes (mutations) affect the structure and function of an organism
LS4 Biological Evolution: Unity and Diversity	Unable to accurately describe patterns in the fossil record data to use as evidence for changes in populations over time, and use the data to support an explanation that some organisms survive better than other organisms because of differences in traits.	Describe patterns in the fossil record data to use as evidence for changes in populations over time, and use the data to support an explanation that some organisms survive better than other organisms because of differences in traits.	Analyze data for patterns in the fossil record data to use as evidence for changes in populations over time, and use the data to construct an explanation that some organisms survive better than other organisms because of similarities and differences in traits.	Analyze and interpret multiple data sets for patterns in the fossil record data to use as evidence for changes in populations over time, and use the data to evaluate and revise an explanation that some organisms survive better than other organisms because of similarities and differences in traits.
Earth and Space Science				
ESS1 Earth's Place in the Universe	Inaccurately uses a model to describe patterns of motions of the sun, Earth, and moon system and the role of gravity in the motions of objects within the galaxy. Misinterprets data to determine scale properties of objects in the solar system or is unable to correctly identify data that provides evidence how the geologic time scale is used to organize Earth's history.	Use a model to describe patterns of motions of the sun, Earth, and moon system and the role of gravity in the motions of objects within the galaxy. Use data to determine scale properties of objects in the solar system and to identify data that provides evidence how the geologic time scale is used to organize Earth's history.	Develop and use a model to describe patterns of motions of the sun, Earth, and moon system and the role of gravity in the motions of objects within galaxies and the solar system. Analyze and interpret data to determine scale properties of objects in the solar system and to determine how the geologic time scale is used to organize Earth's history.	Evaluate and revise a model to describe patterns of motions of the sun, Earth, and moon system and the role of gravity in the motions of objects within galaxies and the solar system. Analyze, interpret, and compare multiple data sets to determine scale properties of objects in the solar system and to determine how the geologic time scale is used to organize Earth's history.

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Earth and Space Science (con't)				
ESS2 Earth's Systems	Inaccurately uses a model to describe the flow of energy driving the cycling of water and Earth's materials within and among Earth's systems. Not able to correctly identify data that supports an explanation for how geologic and atmospheric processes have changed Earth's surfaces and/or climates at varying time and spatial scales.	Use a model to describe the flow of energy driving the cycling of water and Earth's materials within and among Earth's systems. Identify data that can support an explanation for how geologic and atmospheric processes have changed Earth's surfaces and climate at varying time and spatial scales.	Develop and use a model to describe the flow of energy driving the cycling of water and Earth's materials within and among Earth's systems. Analyze and interpret data that can support an explanation for how geologic and atmospheric processes have changed Earth's surfaces and climate at varying time and spatial scales.	Evaluate and revise a provided model to describe the flow of energy driving the cycling of water and Earth's materials within and among Earth's systems. Use scientific reasoning to analyze and interpret data to construct an explanation for how geologic and atmospheric processes have changes Earth's surfaces at varying time and spatial scales.
ESS3 Earth and Human Activity	Unable to correctly identify evidence supporting the uneven distribution of Earth's resources resulting from geoscience processes. Incorrectly applies scientificy principles to select solutions which best minimize human impact on the environment. Incorrectly interprets data about natural hazards to forecst and mitgate their global effects.	Identfiy among competing options, an explanation based on evidence that the uneven distribution of Earth's resources results from geoscience processes. Apply scientific principles to select among competing solutions those which best minimize human impact on the environment. Analyze and interpret data about natural hazards to forecast and mitigate their effects.	Construct an explanation based on collected or selected evidence that the uneven distribution of Earth's resources results from geoscience processes. Apply scientific principles to design solutions that minimize human impact on the environment. Analyze and interpret data about natural hazards to forecast their effects and develop strategies for mitigating those effects.	Evaluate and revise explanations based on evidence that the uneven distribution of Earth's resources results from geoscience processes. Apply scientific principles to evaluate and revise solutions that minimize human impact on the environment. Analyze, interpret, and communicate data from multiple sources about natural hazards to forecast and develop strategies to mitigate their effects.