# High School 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 as a model that is based on the patterns of atomic substructure to identify properties of matter. Limited to no description of change or reaction rates and resultant energy changes due to conditions applied. | Use the periodic table as model that is based on the patterns of atomic substructure to identify properties of matter. Describe changes in reaction rates and energy due to conditions applied. | Use the periodic table as model that is based on the patterns of atomic substructure to describe properties of matter. Use the model to explain changes in reaction rates and energy due to conditions applied. | Use the periodic table as model that is based on the patterns of atomic substructure to predict properties of matter. Use the model to determine evidence to support and/or revise an explanation of the change of reaction rates and resultant energy changes due to conditions applied. |
| PS2 Motion and Stability: Forces and Interactions | Investigation conducted with limited to no use of basic algebraic thinking to collect data that describes the relationship among the net force acting on an object, its mass, and its acceleration. | Conduct an investigation using basic algebraic thinking to collect data that describes the relationship among the net force acting on an object, its mass, and its acceleration. | Plan an investigation using mathematical and computational thinking, to collect data providing evidence of the relationship among the net force acting on an object, its mass, and its acceleration. | Evaluate and revise an investigation using mathematical and computational thinking, to collect data providing evidence of the relationship among the net force acting on an object, its mass, and its acceleration. |
| PS3 Energy | Limited to no use of a model to describe how energy changes in, or forces acting on one part of a system affect other parts of the system. | Use a model to describe how energy changes in, or forces acting on one part of a system affect other parts of the system. | Develop a model to quantitatively describe how energy changes in, or forces acting on, one part of a system affect other parts of the system. | Evaluate and revise a model which quantitatively describes how energy changes in, or forces acting on, one part of a system affect other parts of the system. |
| PS4 Waves and Their Applications in Technologies for Information Transfer | Limited to no use of mathematical representations as a model to describe relationships among amplitude, frequency, and wave speed; and to describe how wave speed depends on the medium through which waves travel. | Use mathematical representations as a model to describe the relationships among amplitude, frequency and wave speed; and to describe how wave speed depends on the medium through which waves travel. | Develop and use mathematical representations as a model to qualitatively predict how various media will affect amplitude, frequency and wave speed. | Evaluate mathematical or algorithmic representations as a model that quantitatively predicts how various media will affect amplitude, frequency and wave speed. |

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| **Life Science** | | | | |
| LS1 From Molecules and Organisms: Structures and Processes | Limited to no investigation conducted and/or limited to no evidence provided that feedback mechanisms maintain homeostasis and/or limited to no claim made for how DNA determines the structure of proteins. | Conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis and make a claim for how DNA determines the structure of proteins. | Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis and construct an explanation for how DNA determines the structure of proteins. | Plan, conduct, and revise an investigation to provide evidence that feedback mechanisms maintain homeostasis and construct and revise an explanation for how DNA determines the structure of proteins. |
| LS2 Ecosystems: Interactions, Energy, and Dynamics | Limited to no application of mathematical concepts to make a claim describing the cycling of matter and flow of energy among organisms in an ecosystem and little to no argument based upon evidence that identify how interactions in ecosystems maintain population and diversity or organisms but changes in conditions may result in a new ecosystem. | Apply mathematical concepts to make a claim describing the cycling of matter and flow of energy among organisms in an ecosystem and construct an argument based upon evidence that identify how interactions in ecosystems maintain population and diversity of organisms but changes in conditions may result in a new ecosystem. | Use mathematical and computational thinking to make and support a claim about the cycling of matter and flow of energy among organisms in an ecosystem and use claims and evidence to describe how interactions in ecosystems maintain population and diversity of organisms but changes in conditions may result in a new ecosystem. | Use mathematical and computational thinking to evaluate and revise claims about the cycling of matter and flow of energy among organisms in an ecosystem and make and support a claim and use reasoning with evidence to argue that interactions in ecosystems maintain population and diversity of organisms but changes in conditions may result in a new ecosystem |
| LS3 Heredity: Inheritance and Variation of Traits | Questions asked are not based on observations about the role of DNA and chromosomes, and traits; limited to no use of evidence to support an argument about causes of inheritable genetic variation; and little to no application of concepts of statistics and probability to identify variation and distribution of expressed traits in a population. | Ask questions based on observations about the role of DNA and chromosomes, and traits; use evidence to support an argument about causes of inheritable genetic variation; and apply concepts of statistics and probability to identify the variation and distribution of expressed traits in a population. | Ask questions to identify relationships about the role of DNA and chromosomes, and traits; use evidence to make a claim about causes of inheritable genetic variation; and apply concepts of statistics and probability to describe the variation and distribution of expressed traits in a population. | Ask questions to clarify relationships about the role of DNA and chromosomes, and traits; use evidence to make and defend a claim about causes of inheritable genetic variation; and apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. |

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| **Life Science** | | | | |
| LS4 Biological Evolution: Unity and Diversity | Little to no use of evidence to support an explanation about given factors that cause evolution and to support an argument for how environmental conditions lead to adaptation within populations. | Use evidence to support an explanation about given factors that cause evolution and to support an argument for how environmental conditions lead to adaptations within populations. | Construct an explanation based on evidence of how given factors result in evolution and to construct an argument for how environmental conditions lead to adaptations within populations. | Construct and revise an explanation based on evidence of how given factors result in evolution and to revise an argument for how environmental conditions lead to adaptations within populations. |
| **Earth and Space Science** | | | | |
| ESS1 Earth's Place in the Universe | Limited to no use of mathematical and computational thinking to describe the motion of objects in the solar system, and/or little to no use of information to describe the processes within stars that produce elements. | Use mathematical and computational thinking to describe the motion of objects in the solar system, and use information to describe the processes within stars that produce elements. | Use mathematical and computational thinking to predict the motion between objects in the solar system due to simple changes in their interactions, and obtain and evaluate information to describe how the processes to produce elements within stars depends on the mass and age of the star. | Use mathematical and computational thinking to predict the motion among numerous objects in the solar system due to changes in their interactions, and to obtain, evaluate, and communicate information to describe how the processes to produce elements within stars depends on the mass and age of the star. |
| ESS2 Earth's Systems | Little to no use of a model to identify how variations in energy flow within the Earth's systems change the climate and/or limited to no use of analysis of data to provided evidence that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. | Use a model to identify how variations in energy flow within the Earth's systems change the climate and analyze data to provide evidence that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. | Use a model to describe how variations in energy flow into and out of Earth's systems cause changes in climate and analyze data to make a claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. | Evaluate and revise a model to describe how variations in energy flow into and out of Earth's systems result in changes in climate and analyze data to evaluate a claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.. |

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|---|---|---|---|---|
| **Earth and Space Science (con't)** | | | | |
| ESS3 Earth and Human Activity | Little to no explanation constructed for how human activity has been influenced by either natural resources, natural hazards, or climate change and/or little to no identification of data from climate models that describe the rate of change in climate and its impacts on Earth's systems. | Construct an explanation for how human activity has been influenced by either natural resources, natural hazards or climate change and identify data from climate models that describes the rate of change in climate and its impacts on Earth's systems. | Construct an explanation for how human activity has been influenced by availability of natural resources, natural hazards and climate change and analyze data from climate models to predict the rate of change in climate and its impacts on Earth's systems. | Construct an explanation for how future human activity will positively or negatively influence the availability of natural resources, natural hazards and climate change and analyze data from climate models to identify how limitations in the models affect the predicted the rate of change in climate and its impacts on Earth's systems. |