New York State Testing Program

P-12 Science Learning Standards

Performance Level Descriptions

Earth and Space Sciences

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Earth and Spaces Sciences Performance Level Descriptions

Performance level descriptions (PLDs) help communicate to students, families, educators, and the public the specific knowledge and skills expected of students in order for them to demonstrate proficiency in each Learning Standard for Science. The PLDs serve several purposes in classroom instruction and assessment. They are the foundation of rich discussion around what students need to do to perform at higher levels, and they explain the progression of learning within a subject area. PLDs are also crucial in explaining student performance on the New York State (NYS) assessments since they make a connection between the scale score, the performance level (e.g., meets the expectation of the learning standards) and specific knowledge and skills typically demonstrated by students achieving at that level.

Policy Definitions of Performance Levels

For each subject area, students perform along a continuum of the knowledge and skills necessary to meet the demands of the Learning Standards for Science. There are students who meet the expectations of the standards with distinction, students who fully meet the expectations, students who minimally meet the expectations, students who partially meet the expectations, and students who do not demonstrate sufficient knowledge or skills required for any performance level. New York State assessments are designed to classify student performance into one of five levels based on the knowledge and skills the student has demonstrated. These performance levels for the Regents level science test are defined as:

NYS Level 5

Students performing at this level meet the expectations of the Science Learning Standards with distinction for Earth and Space Sciences.

NYS Level 4

Students performing at this level fully meet the expectations of the Science Learning Standards for Earth and Space Sciences. They are likely prepared to succeed in the next level of coursework.

NYS Level 3

Students performing at this level minimally meet the expectations of the Science Learning Standards for Earth and Space Sciences. They meet the content area requirements for a Regents diploma but may need additional support to succeed in the next level of coursework.

NYS Level 2

Students performing at this level partially meet the expectations of the Science Learning Standards for Earth and Space Sciences. Students with disabilities performing at this level meet the content area requirements for a local diploma but may need additional support to succeed in the next level of coursework.

NYS Level 1

Students performing at this level demonstrate knowledge, skills and practices embodied by the Science Learning Standards for Earth and Space Sciences below that of a Level 2.

How were the PLDs developed?

Following research-based best practice for the development of PLDs, the number of performance levels and their definitions were specified prior to the articulation of the full descriptions. The New York State Education Department (NYSED) convened a group of NYS science educators to develop the initial draft PLDs for Earth and Space Sciences. In developing PLDs, participants considered policy definitions of the performance levels and the knowledge and skill expectations for each grade level in the Science Learning Standards. Once they established the appropriate knowledge and skills from a particular standard for NYS Level 4 (fully meet), panelists worked together to parse the knowledge and skills across the other performance levels in such a way that the progression of the knowledge and skills was clearly seen moving from Level 1 to Level 5. This process was repeated for all of the standards within the course. The draft PLDs then went through additional rounds of review and edits from a number of NYS-certified educators, content specialists, and assessment experts under NYSED supervision.

How can the PLDs be used in Instruction?

The PLDS, which differentiate and stratify the overall continuum of knowledge and skills defined by the Learning Standards into five distinct levels of learning should be used as guidance by educators. NYSED encourages the use of the PLDs for a variety of purposes, including differentiating instruction to maximize individual student outcomes, creating formative classroom assessments and rubrics to help identify target performance levels for individuals or groups of students, and tracking student growth along the proficiency continuum as described by the PLDs. The knowledge and skills shown in the PLDs describe *typical* performance and progression. However, the order in which students will demonstrate the knowledge and skills within and between performance levels may be staggered (i.e., a student who predominantly demonstrates Level 3 knowledge and skills may simultaneously demonstrate certain knowledge and skills indicative of Level 4). Although the ranges of skills expected of students at each performance level are detailed in the PLDs, specific science concepts will be elaborated and expanded as those skills are applied in the science classroom. Because the Learning Standards for science encompass the Science and Engineering Practices (SEP), Disciplinary Core Ideas (DCI), and Crosscutting Concepts (CCC), each of them must be examined in depth. The integration of these three dimensions provides students with a context for the content of science, a sense of how science knowledge is acquired and understood, and a sense of how the sciences are connected through concepts that have universal meaning across the disciplines.

How are the PLDs used in Assessment?

PLDs are essential in setting performance standards (i.e., “cut scores”) for New York State assessments. Standard setting panelists use PLDs to determine the expectations for students to demonstrate the knowledge and skills necessary to *just barely* attain a Level 2, Level 3, Level 4 or Level 5 on the assessment. This knowledge and these skills drive discussions that influence the panelists as they recommend the cut scores on the assessment. PLDs are also used in question development. Question writers are assigned to write questions that draw on the specific knowledge and skills from a PLD. This ensures that each test has questions that measure student performance all along the continuum. Questions on the Science Regents Examinations will emphasize skills from the PLDs that can be measured via written assessment. Teachers can use the PLDs in the same manner when developing both formative and summative classroom assessments. Tasks that require students to demonstrate knowledge and skills from the PLDs can be tied back to the performance level with which the PLD is associated, providing the teacher with feedback about the students’ progress as well as a wealth of other skills that the students are likely able to demonstrate (or can aspire to in the case of the next-highest PLD).

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Space Systems HS-ESS1-1	Develop and critique models, based on evidence, that illustrate the lifespan of the Sun, the role of nuclear fusion, and how energy from the Sun reaches Earth in the form of electromagnetic radiation, using scale, proportion, and quantity to evaluate the models' validity and limitations in order to revise them.	Develop a model based on evidence to illustrate the lifespan of the Sun and the role of nuclear fusion in the Sun's core to release energy that eventually reaches Earth in the form of radiation.	Complete a model based on evidence to illustrate the lifespan of the Sun and/or the role of nuclear fusion in the Sun's core to release energy that eventually reaches Earth (in the form of radiation).	Given a model, and/or information, describe the evidence that determines the lifespan of the Sun **or** illustrates the role of nuclear fusion in the Sun's core to release energy **or** ways that the Sun's radiation varies.	Given a model, and/or information, identify the evidence, from those provided, that determines the lifespan of the Sun **or** illustrates the role of nuclear fusion in the Sun's core to release energy **or** identify the correct pattern, from those provided, that shows variation in solar output.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Space Systems HS-ESS1-2	Construct an explanation of the Big Bang theory using multiple sources, based on valid and reliable evidence of energy from light spectra, motions of distant galaxies, and the composition of matter in the universe (Cosmic Microwave Background Radiation (CMBR)).	Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.	Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, or motion of distant galaxies, and/or the composition of matter in the universe (Cosmic Microwave Background Radiation (CMBR)).	Identify the explanation, that supports the Big Bang theory based on astronomical evidence of light spectra **or** motion of distant galaxies **or** the composition of matter in the universe (Cosmic Microwave Background Radiation (CMBR)).	Identify the evidence, from those provided, that supports the Big Bang theory, based on astronomical evidence.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Space Systems HS-ESS1-3	Synthesize valid and reliable scientific information in order to communicate scientific ideas in multiple formats (i.e. orally, graphically, textually, or mathematically) about the way stars, over their life cycles, produce elements.	Communicate scientific ideas about the way stars, over their life cycles, produce elements.	Describe or identify one scientific idea from a source about how stars, over their life cycles, produce different elements depending on their masses or their life cycle.	Identify the given scientific idea that describes how different elements are produced by different types of stars over their life cycle.	Given a scientific idea, identify the claim, from those provided, that describes how stars form elements over their life cycle.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Space Systems HS-ESS1-4	Use mathematical and computational analysis to predict the motions of orbiting bodies in the solar system and/or other parts of the universe.	Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.	Use a mathematical or a computational representation(s) to describe the motion of orbiting object(s) in the solar system.	Identify a correct mathematical or computational representation that describes and/or predicts the motion of orbiting object(s) in the solar system.	Using mathematical reasoning and given data, predict the motion of an orbiting object in the solar system.
Space Systems HS-ESS1-7 (NYSED)	Apply scientific ideas, principles, and evidence to support the claim that the phases of the Moon, eclipses, tides, and seasons change cyclically and that celestial events are the result of the relative motion and perspective of an observer.	Construct an explanation using evidence to support the claim that the phases of the Moon, eclipses, tides, and seasons change cyclically.	Construct an explanation using evidence to support the claim that the phases of the Moon or eclipses or tides or seasons change cyclically **or** that celestial events are the result of the relative motion and/or perspective of an observer.	Identify an evidence-based explanation, from those provided, that supports the claim that the phases of the Moon or eclipses or tides or seasons change cyclically **or** that celestial events are the result of the relative motion and/or perspective of an observer.	Identify the evidence that supports the claim that the phases of the Moon or eclipses or tides or seasons change cyclically **or** that celestial events are the result of the relative motion and the perspective of an observer.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
History of Earth HS-ESS1-5	Using multiple sources of evidence, analyze the patterns in the data of the past and current movements of continental and oceanic crust to explain the ages of crustal rocks. Evaluate evidence from current and historical scientific ideas and principles that contribute to the theory of plate tectonics.	Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.	Evaluate evidence of the past and current movements of continental and/or oceanic crust and/or use the theory of plate tectonics, determine the pattern in the ages of crustal rocks.	Identify the correct pattern of the ages of crustal rocks, using past and current movements of continental crust and/or oceanic crust and/or the theory of plate tectonics.	Based on evidence of past and current crustal movements, identify the relative ages of continental and/or oceanic crust.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
History of Earth HS-ESS1-6	Analyze empirical evidence from multiple sources, to construct an explanation of Earth's formation and early history, based upon the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.	Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.	Using evidence and scientific reasoning from ancient Earth materials, or meteorites, or other planetary surfaces, construct an account of Earth's formation and/or early history, **or** use evidence from radiometric dating of rocks and/or other materials to construct an account of the formation or early history of objects in the solar system.	Describe or identify the evidence from ancient Earth materials, or meteorites, or other planetary surfaces (other objects in the solar system) to support/refute a given explanation of Earth's formation and/or early history, **or** use evidence from radiometric dating to support/refute a given explanation of the formation of a solar system object.	Identify the evidence (radiometric dating, impact cratering), from those provided, that supports/refutes a given explanation of Earth's or another planetary surface's formation or early history.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
History of Earth HS-ESS2-1	Develop a complex model which allows for manipulation and testing that demonstrates the relationships between Earth's internal and surface processes responsible for the formation of continental and ocean-floor features across varying spatial and temporal scales.	Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.	Use a model to explain how Earth's internal and/or surface processes (constructive and/or destructive) operate at different spatial or temporal scales to form continental and/or ocean-floor features **or** to explain the distribution of rocks and/or minerals within Earth's crust.	Use a model to identify Earth's internal and/or surface process(es) (constructive and/or destructive) that operate at different spatial or temporal scales to form continental and/or ocean-floor features **or** to identify an Earth surface or internal process that forms continental or oceanic floor features **or** to explain the distribution of rocks and/or minerals within Earth's crust.	Use a model to determine whether a continental or ocean-floor feature results from Earth's internal and/or surface process(es) (constructive and/or destructive) **or** to identify the distribution of rocks and/or minerals within Earth's crust.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Earth's Systems HS-ESS2-2	Compare and contrast various geoscience data sets to examine consistency of measurements and observations in order to make the claim that changes to Earth's surface can create feedbacks that influence the stability of Earth's systems over time.	Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to Earth's systems.	Analyze geoscience data/information to support the claim that a change to Earth's surface or an Earth system can create a feedback that cause changes to one or more Earth's system(s).	Identify the geoscience data/information that provides evidence for a given claim that a change to Earth's surface or an Earth system results in a change to another Earth system **or** provides evidence to support/refute a given claim that a change to an Earth's surface or one Earth system results in a change to another Earth system.	Using geoscience data/information, identify one change in Earth's surface or an Earth system and how it will result in a change to another Earth system.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Earth's Systems HS-ESS2-3	Develop a complex model of Earth's interior using multiple pieces of evidence to illustrate the relationships between systems and/or the components of a system in order to describe the cycling of matter by thermal convection.	Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.	Given a model, describe the cycling of matter (e.g., minerals and rock cycle) by thermal convection based on evidence of Earth's interior **or** given a model with evidence, describe stages of recycling of Earth materials by surface processes or by convection currents in the mantle **or** identify the location of the formation of rock types using evidence from a given model.	Given a model of Earth's interior, identify the evidence that shows the cycling of matter by thermal convection **or** given a model with evidence, identify stages of recycling of Earth materials by surface processes or by convection currents in the mantle **or** identify a rock or mineral using evidence from a given a model of physical and chemical properties of rocks or minerals.	Given a model of Earth's interior, identify the evidence, from those provided, that shows the cycling of matter by thermal convection **or** given a model with evidence, identify a stage of recycling of Earth materials by surface processes or by convection currents in the mantle.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Earth's Systems HS-ESS2-5	Plan and conduct an investigation to demonstrate how the water's structure, in all of its phases, affects its properties, and how water effects on Earth materials and surface processes.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	Using a given plan, conduct an investigation of the physical and chemical properties of water and water's effects on Earth materials and surface processes **or** given a plan, and the results of an investigation, describe how the properties of water affect an Earth material and a surface process.	Given the results of an investigation or information of the chemical and/or physical properties of water (in its different forms), describe an effect that water would have on an Earth material or a surface process.	Given the results of an investigation or information about the chemical and/or physical properties of water (in its different forms) identify an effect that water would have on an Earth material or surface process.
Earth's Systems HS-ESS2-6	Develop and analyze data from a quantitative model of the carbon cycle to predict how a change in carbon levels in one system will affect other Earth systems.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	Use/complete a quantitative model to describe the cycling of carbon between two Earth spheres (hydrosphere, atmosphere, geosphere, and biosphere).	Use a quantitative/ qualitative model to identify the cycling of carbon between two Earth spheres (hydrosphere, atmosphere, geosphere, and biosphere).	Use a quantitative/ qualitative model that shows the cycling of carbon between two Earth spheres to identify the relative concentrations of carbon present in each sphere.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Earth's Systems HS-ESS2-7	Compare and evaluate competing scientifically-based arguments in light of currently accepted explanations, new evidence, limitations, constraints, and ethical issues about the coevolution of Earth's systems and life on Earth.	Construct an argument based on evidence about the coevolution of Earth's systems and life on Earth.	Support a given argument by describing the evidence for the coevolution of feedbacks between Earth's systems and life on Earth.	Support a given argument by identifying the evidence for the coevolution of feedbacks between Earth's systems and life on Earth.	Identify the correct example, from those provided, of the coevolution of two Earth's systems and the effect on life on Earth.

Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Weather & Climate HS-ESS2-4	Evaluate and analyze data from climate change models to describe climate factors and the causational or correlational effect they have on climate change over different time scales.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	Use a model/information to identify factor(s) that affect the flow of energy into or out of an Earth system and describe one effect this would have on climate occurring over various timescales **or** use a model/information to describe how one change in the flow of energy in and out of an Earth system results in a change of climate.	Use a model/information to identify how (a) factor(s) affect(s) the flow of energy into or out of an Earth system and identify the resulting effect on climate over a timescale.	Use a model/information to identify an energy flow into or out of an Earth system that results in a change in the climate.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Weather & Climate HS-ESS3-5	Collect and analyze geoscience data from global climate models to make valid and reliable scientific claims. Use those claims to determine an optimal design solution to slow the rate of climate change and its associated future impacts to Earth systems.	Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.	Analyze geoscience data or the results from a global climate model to make an evidence-based claim (forecast) of the current rate of global or regional climate change and/or an associated future impact to an Earth system.	Use geoscience data and/or the results from a global climate model, to identify the evidence-based claim (forecast), from those provided, of the current rate of global or regional climate change and/or identify an associated future impact to an Earth system.	Given geoscience data or the results from a global climate model, or a given evidence-based claim (forecast) of the current rate of global or regional climate change, identify an associated future impact to an Earth system.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Weather & Climate HS-ESS2-8	Collect and analyze global and regional weather data using tools, technologies, and/or models, to communicate in multiple formats how the movement and interactions of air masses result in changes in weather conditions.	Evaluate data and communicate information to explain how the movement and interactions of air masses result in changes in weather conditions.	Evaluate data and communicate information to identify the patterns of movement and/or interactions of air masses and/or the resulting changes in weather conditions.	Use data to identify the patterns of movement or the interactions of air masses and the resulting changes in weather conditions **or** to identify factors that drive the movement of air masses **or** from given weather conditions, identify evidence from maps that supports these conditions.	Use data and/or patterns of movement and interactions of air masses to identify the resulting changes in weather conditions **or** identify one factor that drives the movement of air masses **or** from those provided, use evidence from maps to account for weather conditions **or** given weather conditions, identify evidence found on maps that account for one of these conditions.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Human Sustainability HS-ESS3-1	Construct an explanation based on evidence synthesized from a variety of sources of how human activity has been affected by the availability of natural resources, the occurrence of natural hazards, and changes in climate. Design a plan to adapt to and/or mitigate the effects of natural perturbations.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	Construct an explanation based on evidence that describes how human activity has been affected by the availability of natural resources, or occurrence of natural hazards, or changes in climate.	Identify an evidence-based explanation, from those provided, that describes how the availability of natural resources, or the occurrence of natural hazards, or changes in climate have influenced human activity.	Identify the evidence that supports an explanation for how human activity has been affected by the availability of natural resources, or the occurrence of natural hazards, or changes in climate.
Human Sustainability HS-ESS3-2	Design a solution for developing, managing, and utilizing energy or mineral resources based on cost-benefit ratios taking into consideration social, ethical, environmental, or geopolitical issues.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	Evaluate competing design solutions for developing or managing, or utilizing energy or (mineral) resources based on cost-benefit ratios.	Evaluate given design solutions for developing or managing or utilizing energy or (mineral) resources based on cost-benefit ratios.	Given a design solution, identify the benefit(s)/costs of developing or managing or utilizing energy or (mineral) resources.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Human Sustainability HS-ESS3-3	Create a computational simulation resulting in multiple data sets to illustrate relationships among the management of natural resources, the sustainability of human populations, and/or biodiversity. Compare the outcomes with what is known about the real world.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.	Given parameters/data (from a computational simulation), describe a relationship among the management of natural resources, and the sustainability of human populations and biodiversity.	Given parameters /or data (in a computational simulation), describe a relationship between two of the following: the management of natural resources, the sustainability of human populations, and/or biodiversity **or** identify how a solution to the management of natural resources or the sustainability of human populations, and/or biodiversity reduces the impact on humans.	Based on data (from a computational simulation), identify the relationship, from those provided, between two of the following: the management of natural resources, the sustainability of human populations, and biodiversity.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Human Sustainability HS-ESS3-4	Use scientific information to generate a number of possible refinements to a technological solution. Describe and quantify the criteria, constraints, and tradeoffs of the solution to the problem that reduces impacts of human activities on natural systems.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	Given a technological solution, describe the geoscience problem being addressed and how the solution reduces the impact of human activities on a natural system.	Given a technological solution to a geoscience problem, identify how the solution reduces impacts of human activities on the natural system **or** identify how the solution reduces the impact on humans.	Given a technological solution, identify the natural system that is being impacted by human activity **or** identify how the solution reduces the impact on a natural system.
Human Sustainability HS-ESS3-6	Create a computational representation to illustrate the relationships among Earth systems and make a claim using empirical data about how those relationships are being modified due to human activity.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.	Given data and/or a model (computational representation), describe a relationship among Earth systems and how that relationship is being modified due to human activity.	Given data and/or a model (computational representation), identify the relationship between two Earth systems that are being modified due to human activity.	Given data and/or a model (computational/ graphic representation), identify how one Earth system is being modified due to human activity.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Engineering Design HS-ETS1-1	Evaluate two or more major global challenges to specify qualitative and quantitative criteria and constraints for solutions, which could include new technologies, that account for societal needs and wants.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	Analyze a major global challenge to specify qualitative or quantitative criteria and constraints for solutions that account for societal needs and wants.	Given a major global challenge, describe the qualitative or quantitative criteria or constraint for the given solution that best accounts for societal needs or wants.	Given a major global challenge, identify the criteria or constraint for the given solution that best accounts for societal needs or wants.
Engineering Design HS-ETS1-2	For a complex real-world problem, design multiple solutions to sub-problems based on student generated data and/or scientific information from other sources. Describe the rationale, criteria, and constraints of each sub-problem.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	Given a complex real-world problem, identify one smaller more manageable problem and describe a solution to that problem that can be solved through engineering.	Given a complex real-world problem that has been broken down into smaller, more manageable problems, identify a solution to one smaller problem that can be solved through engineering.	Identify the solution, from those provided, that addresses a smaller, more manageable real-world problem.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Engineering Design HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria by generating a prioritized list of criteria and trade-offs that account for a range of multiple constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. Explain how these solutions affect society and the environment.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of multiple constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	Identify a solution to a complex real-world problem based on prioritized criteria and/or trade-offs (positives and negatives) for a range of constraints, such as cost, safety, reliability, aesthetics, as well as possible social, cultural, or environmental impacts.	Describe a solution to a complex real-world problem based on given criteria and constraints.	Identify the solution from those provided, to a complex real-world problem based on given criteria and/or constraints.

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Topic and PE	NYS Level 5	NYS Level 4	NYS Level 3	NYS Level 2	NYS Level 1
Engineering Design HS-ETS1-4	Use a computer simulation to model the impact of proposed solutions to related complex real-world problems with numerous criteria and constraints on interactions within and between systems relevant to the problem.	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	Given data (from a computer simulation), describe the impact of proposed solutions to a complex real-world problem with limited criteria and constraints on interactions within and/or between systems relevant to the problem.	Given data (from a computer simulation), identify the impact of a proposed solution to a complex real-world problem, or the impact on an interaction within or between two systems relevant to the problem.	Identify the impact of a given solution to a complex real-world problem.