

Science Gr 6-8 SEP & CCC PLDs
Performance Level Descriptors (PLDs)

	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
	The Minimally Proficient student strives to	The Partially Proficient student is able to	The Proficient student is able to	The Highly Proficient student is able to
Science and Engineering Practices				
Asking Questions and Defining Problems (Q/P)	- ask questions that identify evidence - ask questions that can be investigated scientifically	- ask questions that identify evidence or the premise(s) of an argument - ask questions to determine independent and dependent variables - ask questions that frame a hypothesis - ask questions that arise from observation of phenomena	- ask questions that clarify evidence and/or the premise(s) of an argument - ask questions to determine relationships between variables - ask questions that frame a hypothesis based on observations and scientific principles - ask questions that arise from careful observation of phenomena to clarify and/or seek additional information	- ask questions that require sufficient and appropriate empirical evidence to answer - ask questions to clarify and/or refine a model, an explanation, or an engineering problem - ask questions that challenge the premise(s) of an argument or the interpretation of data - ask questions that arise from careful observation of unexpected results to clarify and/or seek additional information
Developing and Using Models (MOD)	- identify models that describe phenomena - identify modifications in models	- develop and use models to describe, test, and predict phenomena and design systems - develop and use models to represent evidence - develop and use models to show the relationships among variables	- develop and use models to describe, test, and predict more abstract phenomena and design systems - develop or modify a model—based on evidence—to match what happens if a variable or component of a system is changed - develop and use models to show relationships among variables, including those that are not observable - develop and use models to predict and/or describe phenomena	- develop, revise, and use models to evaluate or revise a model for a proposed object or tool - develop, revise, and use models to evaluate a model of simple systems with uncertain and less predictable factors - develop, revise, and use models to propose design changes to show the relationships among variables, including those that are not observable - develop, revise, and use models to describe unobservable mechanisms

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			develop and use models to generate data to test ideas about phenomena in natural or designed systems	develop, revise, and use models to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales
Planning and Carrying Out Investigations (INV)	- identify variables - collect data	- carry out pre-planned investigations that use multiple variables and provide evidence to support explanations - carry out pre-planned investigations that involve independent and dependent variables and controls - carry out pre-planned investigations that include various methods for collecting data	- develop a plan and carry out investigations that evaluate the accuracy of various methods for collecting data - develop a plan and carry out investigations that produce data to answer scientific questions or test design solutions - develop a plan and carry out investigations that collect data about the performance of a proposed object, tool, process, or system	- plan, carry out, evaluate, and revise investigations that include how measurements will be recorded and how much data is needed to support a claim - plan, carry out, evaluate, and revise investigations that involve an evaluation and/or revisions to the experimental design
Analyzing and Interpreting Data (DATA)	identify relationships contained in graphical displays of data	- identify, distinguish, or describe data to construct graphical displays of data - identify, distinguish, or describe data to match graphical displays with data sets	- analyze and interpret data to identify linear and nonlinear relationships in graphical displays - analyze and interpret data using graphical displays (e.g., maps, charts, graphs, and/or tables) of large data sets to identify temporal and spatial relationships - analyze and interpret data to distinguish between causal and correlational relationships in data - analyze and interpret data to provide evidence for phenomena	- analyze, interpret, and evaluate data to extend quantitative analysis to investigations, distinguishing between correlation and causation - analyze, interpret, and evaluate data to apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible - analyze, interpret, and evaluate data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success

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			● analyze and interpret data to seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials) ● analyze and interpret data to determine similarities and differences in findings	
Using Mathematics and Computational Thinking (MCT)	● identify patterns in data sets	● use mathematical and computational thinking to distinguish patterns in data sets that support explanations and arguments	● use mathematical and computational thinking in the selection of digital tools (e.g., computers) to analyze very large data sets for patterns and trends ● use mathematical and computational thinking to describe and/or support scientific conclusions and design solutions ● use mathematical and computational thinking in the use of digital tools and/or mathematical concepts and arguments	● use mathematical and computational thinking to create or evaluate algorithms (a series of ordered steps) to solve a problem ● use mathematical and computational thinking to apply mathematical concepts and/or processes (e.g., ratio, rate, percent, basic operations, simple algebra) to scientific and engineering questions and problems ● use mathematical and computational thinking to test and compare proposed solutions to an engineering design problem
Constructing Explanations and Designing Solutions (E/S)	● identify evidence that support scientific ideas, principles, and theories ● identify models or representations that support an explanation	● distinguish between explanations and solutions to identify those supported by multiple sources of evidence consistent with scientific ideas ● distinguish between explanations and solutions to identify those that include qualitative or quantitative relationships between variables that describe phenomena ● distinguish between explanations and solutions to identify those based on valid and reliable evidence	● construct explanations and design solutions that include qualitative or quantitative relationships between variables that predict phenomena ● construct explanations and design solutions that apply scientific reasoning to show why the data or evidence is adequate for the explanation or conclusion	● construct and evaluate explanations and solutions that apply scientific ideas or principles in testing a design of an object, tool, process, or system ● construct and evaluate explanations and solutions that meet specific design criteria and constraints ● construct and evaluate explanations and solutions that optimize performance of a design by prioritizing criteria

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Engaging in Argument from Evidence (ARG)	●identify arguments on the same topic	●differentiate between two arguments on the same topic	●construct a convincing argument that supports claims ●engage in arguments from evidence to compare and critique two arguments and analyze whether they emphasize similar or different evidence	●engage in arguments from evidence to construct, evaluate, or revise a convincing argument that refutes claims ●engage in arguments from evidence to provide critiques about explanations, procedures, models, and questions by citing relevant evidence
Obtaining, Evaluating, and Communicating Information (INFO)	●identify the accuracy of ideas and methods	●distinguish between the reliability of ideas and methods based on the credibility of sources	●obtain, evaluate, and communicate information to critically review scientific information to determine the central idea ●obtain, evaluate, and communicate information to describe patterns in and/or evidence about the natural and/or designed worlds ●obtain, evaluate, and communicate information to evaluate data, hypotheses, and/or conclusions in scientific and technical texts in light of competing information or accounts ●obtain, evaluate, and communicate information to communicate scientific and/or technical information	●obtain, evaluate, and communicate information to synthesize information from multiple appropriate sources and assess the credibility, accuracy, possible bias, and the methods used to explain whether the sources are supported by the evidence

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Cross-cutting Concepts					
Patterns (PAT)	●identify patterns in rates of change	●distinguish patterns in numerical relationships that provide information about natural and human-designed systems	●recognize that macroscopic patterns are related to the nature of microscopic and atomic-level structure ●identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems ●use graphs, charts, and images to identify patterns in data	●use patterns to identify cause-and-effect relationships, and use graphs and charts to identify patterns in data ●evaluate patterns to identify cause-and-effect relationships	
Cause and Effect (C/E)	●identify relationships as causal	●describe relationships as correlational ●understand that phenomena may have more than one cause	●classify relationships as causal or correlational, and recognize that correlation does not necessarily imply causation ●use cause-and-effect relationships to predict phenomena ●understand that some cause-and-effect relationships can only be described using probability	●evaluate causal or correlational relationships, and recognize that correlation does not necessarily imply causation ●identify some cause-and-effect relationships that can only be described using probability	
Structure and Function (S/F)	●identify how the shape of a structure determines its function ●identify how designed structures determine how they function	●understand how the function of a structure depends on the shape, composition, and relationships among its parts ●differentiate complex designed structures and systems to determine how they function	●describe complex and microscopic structures and systems to demonstrate how their function depends on the shapes, composition, and relationships among its parts ●analyze complex natural and designed structures and systems to determine how they function	●evaluate complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among its parts ●design structures to serve particular functions by taking into account properties of different materials and how materials can be shaped and used	

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Systems and Systems Models (SYS)	●identify systems that have subsystems ●identify models that represent systems ●identify models that are limited	●describe how systems may have subsystems and are a part of larger complex systems ●distinguish models that represent system interactions ●understand that models are limited in that they only represent certain aspects of the system	●understand that systems may interact with other systems; they may have subsystems and be a part of larger complex systems ●use models to represent system interactions, such as inputs, processes, and outputs, and identify/explain/show how energy, matter, and information flows within systems ●identify the limitations of a specific model	●use models to represent system interactions, such as inputs, processes, and outputs, and identify/explain/show how energy, matter, and information flows within systems ●revise models to represent system interactions—such as inputs, processes and outputs
Stability and Change (S/C)	●identify stability and change in natural or designed systems ●identify changes in one part of a system that cause changes in another part	●describe stability and change in natural or designed systems by examining changes over time ●describe how changes in one part of a system might cause large changes in another part	●demonstrate stability and change in any system by examining changes over time and considering forces at different scales, including the atomic scale ●show that changes in one part of a system might cause large changes in another part ●show that systems in dynamic equilibrium are stable due to a balance of feedback mechanisms ●demonstrate how stability might be disturbed either by sudden events or gradual changes that accumulate over time	●predict states of stability by examining changes over time and considering forces at different scales, including the atomic scale ●predict how changes in one part of a system might cause large changes in another part

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Scale, Proportion, and Quantity (SPQ)	●identify time, space, and energy at different scales	●distinguish time, space, and energy phenomena at various scales ●differentiate phenomena observed at one scale that may not be observable at another scale	●observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small ●understand that the function of natural and designed systems may change with scale ●represent scientific relationships through the use of algebraic expressions and equations ●use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes ●represent scientific relationships through the use of algebraic expressions and equations	●use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to predict how a change affects the magnitude of properties and process ●review and revise scientific relationships through the use of algebraic expressions and equations
Energy and Matter (E/M)	●identify situations where matter is conserved ●identify situations where energy is conserved	●describe that matter is conserved because atoms are conserved ●describe the flow of energy as it is transferred	●understand that matter is conserved because atoms are conserved in physical and chemical processes ●show that within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter ●demonstrate that energy may take different forms (e.g., energy in fields, thermal energy, energy of motion) ●demonstrate that the transfer of energy can be tracked as energy flows through a designed or natural system	●critique or revise statements that demonstrate that the transfer of energy can be tracked as energy flows through a designed or natural system