NEW MEXICO
Public Education Department

F.16 Physics - Grades 9-12

PUBLISHER/PROVIDER MATERIAL INFORMATION (TO BE COMPLETED BY PUBLISHER/PROVIDER)			
Publisher/Provider Name/Imprint:		Grade(s):	
Title of Student Edition:		Student Edition ISBN:	
Title of Teacher Edition:		Teacher Edition ISBN:	
Title of SE Workbook:		SE Workbook ISBN:	

PUBLISHER/PROVIDER CITATION VIDEO: Reviewer must view video before starting the review of this set of materials.			
Citation Video Link:			
Reviewer citation video certification:	I certify that I have viewed the citation video for this specific publisher and set of materials.		
Digital Material Log In (if applicable):	Website:	Username:	Password:

SCORING (TO BE COMPLETED BY REVIEWER AND FACILITATOR)			
Reviewer Number:		Date:	

Section 1: Standards Review: Science

Abbreviations for the Form F Standards Review Tab:
- PE: Performance Expectation
- DCI: Disciplinary Core Idea
- SEP: Science and Engineering Practices
- CCC: Crosscutting Concepts
- CONN: Connections
- NM: NM STEM Ready Standard
- CCSS: Common Core State Standards for ELA/Literacy in Science and Common Core State Standards for Math in Science as identified in the NGSS

PUBLISHER/PROVIDER INSTRUCTIONS:
- Publisher/Provider citations for this section will refer to the **Teacher Edition (teacher-facing core material).** The cited Teacher Edition should correspond with the title and ISBN entered on the Form F cover page, whether in print, online, or both. The review set submitted to the summer review institute should also correspond with what is cited on the Form F. If the review set is an online platform only, then that is what should be cited on the Form F and submitted for review by the review teams. If the review set is in print only, then that is what should be cited on the Form F and submitted for review by the review teams.
- For this section, the publisher/provider will enter one citation per DCI, SEP, CCC, CONN, and NM standard in Column D. Each citation should direct the reviewer to a specific location in the materials that best meets the standard. The citations should be concise and should allow the reviewer to easily determine that all components of the standard have been met. Each citation should cover no more than 3 pages within the materials. ***Any cells grayed out do not require a citation.***
  - o Column D: Enter one citation in Column D from the **Teacher Edition (teacher-facing core material)**. Each citation should direct the reviewer to a specific location in the materials that best meets the standard. The cited material for each DCI, SEP, CCC, and CONN must directly relate to the PE under which they fall.
- The material will be scored for alignment with each DCI, SEP, CCC, CONN, and NM standard within each PE as “Meets expectations", “Partially meets expectations", or “Does not meet expectations” based on the citations provided. A score for the PE will be derived from the related DCIs, SEPS, CCCs, CONNs, and NM Standards within the PE.
  - o **NOTE: You may not use a citation more than once across ALL sections of the rubric.**

Abbreviations for the Form F Standards Review Tab:
- **PE:** Performance Expectation
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Reviewer directions for Science Standards Review:

Columns D-G: The publisher/provider will provide a citation from the **Teacher Edition (teacher-facing core material)** (print and/or digital) for each DCI, SEP, CCC, CONN, and NM standard in column D. Review the cited material and score the material by determining the degree to which it meets the standard:
- o M = Meets the standard
- o P = Partially meets the standard
- o D = Does not meet the standard

Start by scoring the DCI(s) for the PE. If all DCIs within the PE score a D (columns E *AND* I), score all other components within the PE with a D and move on to the next PE.

Evidence for the publisher citations is required *only* if you score the materialswith a D. For your evidence for each standard that scores a D, choose one of the options from the dropdown menu in Column G. If the reason for scoring the materials with a D is not one of the dropdown options, enter your own evidence statement in the cell in Column G.
- ***o Any cells grayed out do not require a citation or evidence. The score cells in those rows will automatically populate if formulated to do so.***
- ***o Each cell in the Score column (column E) will turn purple as you score the materials.***

Columns H-K: Using the **Student Edition, Student Workbook, or other student-facing materials**, provide a citation for each DCI, SEP, CCC, CONN, and NM standard in Column H from the student materials that best meets the standard and addresses all components of the standard. Review the cited material, score the material by determining the degree to which it meets the standard, and provide evidence to support your determination:
- o M = Meets the standard
- o P = Partially meets the standard
- o D = Does not meet the standard

Start by scoring the DCI(s) for the PE. If all DCIs within the PE score a D (columns E AND I), score all other components within the PE with a D and move on to the next PE.
- ***o Any cells grayed out do not require a citation or evidence. The score cells in those rows will automatically populate if formulated to do so.***
- ***o Each cell in the Reviewer Citation column, Score column, and Reviewer Evidence column (columns H, I, and K) will turn purple as you score the materials.***

Criteria #	Standard Identifier	F.16 Grades 9-12 Physics Standards Review:	Publisher/Provider Citation from Teacher Edition	Score	If Scored D: Reviewer's Evidence for Publisher Citation	Reviewer Citation from Student Edition/Workbook	Score	Required: Reviewer's Evidence	Comments, other citations, notes
Forces and Interactions									
1	**PE**	**HS-PS2-1. Students who demonstrate understanding can: Analyze data to support the claim that Newton’s second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.**							
2	**DCI**	**PS2.A: Forces and Motion** • Newton’s second law accurately predicts changes in the motion of macroscopic objects.							
3	**SEP**	**Analyzing and Interpreting Data** *Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.* • Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.							
4	**CONN**	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • Theories and laws provide explanations in science.							
5	**CONN**	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • Laws are statements or descriptions of the relationships among observable phenomena.							
6	**CCC**	**Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.							
7	**PE**	**HS-PS2-2. Students who demonstrate understanding can: Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.**							
8	**DCI**	**PS2.A: Forces and Motion** • Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object.							
9	**DCI**	**PS2.A: Forces and Motion** • If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system.							
10	**SEP**	**Using Mathematics and Computational Thinking** *Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis; a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms; and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.* • Use mathematical representations of phenomena to describe explanations.							
11	**CCC**	**Systems and System Models** • When investigating or describing a system, the boundaries and initial conditions of the system need to be defined.							
12	**PE**	**HS-PS2-3. Students who demonstrate understanding can: Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.**							
13	**DCI**	**PS2.A: Forces and Motion** • If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system.							
14	**DCI**	**ETS1.A: Defining and Delimiting an Engineering Problem** • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.							
15	**DCI**	**ETS1.C: Optimizing the Design Solution** • Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.							
16	**SEP**	**Constructing Explanations and Designing Solutions** *Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.* • Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects.							

17	CCC	**Cause and Effect** •Systems can be designed to cause a desired effect.							
18	PE	**HS-PS2-4. Students who demonstrate understanding can: Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.**							
19	DCI	**PS2.B: Types of Interactions** • Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects.							
20	DCI	**PS2.B: Types of Interactions** • Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields.							
21	SEP	**Using Mathematics and Computational Thinking** *Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis; a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms; and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.* • Use mathematical representations of phenomena to describe explanations.							
22	CONN	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • Theories and laws provide explanations in science.							
23	CONN	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • Laws are statements or descriptions of the relationships among observable phenomena.							
24	CCC	**Patterns** • Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.							
25	PE	**HS-PS2-5. Students who demonstrate understanding can: Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.**							
26	DCI	**PS2.B: Types of Interactions** • Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects. (HS-PS2-4)							
27	DCI	**PS2.B: Types of Interactions** • Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields.							
28	DCI	**PS3.A: Definitions of Energy** • "Electrical energy" may mean energy stored in a battery or energy transmitted by electric currents.							
29	SEP	**Planning and Carrying Out Investigations** *Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical and empirical models.* • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.							
30	CCC	**Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.							
31	PE	**HS-PS2-6. Students who demonstrate understanding can: Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.**							
32	DCI	**PS2.B: Types of Interactions** • Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects.							
33	SEP	**Obtaining, Evaluating, and Communicating Information** *Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs.* • Communicate scientific and technical information (e.g., about the process of development and the design and performance of a proposed process or system) in multiple formats (including oral, graphical, textual and mathematical).							
34	CCC	**Structure and Function** • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.							
Energy									
35	PE	**HS-PS3-1. Students who demonstrate understanding can: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.**							
36	DCI	**PS3.A: Definitions of Energy** • Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms.							
37	DCI	**PS3.B: Conservation of Energy and Energy Transfer** • Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system.							
38	DCI	**PS3.B: Conservation of Energy and Energy Transfer** • Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.							

39	DCI	**PS3.B: Conservation of Energy and Energy Transfer** • Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g., relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior.							
40	DCI	**PS3.B: Conservation of Energy and Energy Transfer** • The availability of energy limits what can occur in any system.							
41	SEP	**Using Mathematics and Computational Thinking** *Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis; a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms; and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.* • Create a computational model or simulation of a phenomenon, designed device, process, or system.							
42	CCC	**Systems and System Models** • Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models.							
43	CONN	**Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes the universe is a vast single system in which basic laws are consistent.							
44	PE	**HS-PS3-2. Students who demonstrate understanding can: Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).**							
45	DCI	**PS3.A: Definitions of Energy** • Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms.							
46	DCI	**PS3.A: Definitions of Energy** • At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy.							
47	DCI	**PS3.A: Definitions of Energy** • These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space.							
48	SEP	**Developing and Using Models** *Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.* • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.							
49	CCC	**Energy and Matter** • Energy cannot be created or destroyed; it only moves between one place and another place, between objects and/or fields, or between systems.							
50	PE	**HS-PS3-3. Students who demonstrate understanding can: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.**							
51	DCI	**PS3.A: Definitions of Energy** • At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy.							
52	DCI	**PS3.D: Energy in Chemical Processes** • Although energy cannot be destroyed, it can be converted to less useful forms — for example, to thermal energy in the surrounding environment.							
53	DCI	**ETS1.A: Defining and Delimiting an Engineering Problem** • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.							
54	SEP	**Constructing Explanations and Designing Solutions** *Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.* • Design, evaluate, and/or refine a solution to a complex real-world problem based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.							
55	CCC	**Energy and Matter** • Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system.							
56	CONN	**Influence of Science, Engineering and Technology on Society and the Natural World** • Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks.							
57	PE	**HS-PS3-4. Students who demonstrate understanding can: Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).**							
58	DCI	**PS3.B: Conservation of Energy and Energy Transfer** • Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.							
59	DCI	**PS3.B: Conservation of Energy and Energy Transfer** • Uncontrolled systems always evolve toward more stable states—that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down).							

60	DCI	**PS3.D: Energy in Chemical Processes** • Although energy cannot be destroyed, it can be converted to less useful forms — for example, to thermal energy in the surrounding environment.							
61	SEP	**Planning and Carrying Out Investigations** *Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.* • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.							
62	CCC	**Systems and System Models** • When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.							
63	PE	**HS-PS3-5. Students who demonstrate understanding can: Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.**							
64	DCI	**PS3.C: Relationship Between Energy and Forces** • When two objects interacting through a field change relative position, the energy stored in the field is changed.							
65	SEP	**Developing and Using Models** *Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).* • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.							
66	CCC	**Cause and Effect** • Cause and effect relationships can be suggested and predicted for complex natural and human-designed systems by examining what is known about smaller scale mechanisms within the system.							
Waves and Electromagnetic Radiation									
67	PE	**HS-PS4-1. Students who demonstrate understanding can: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.**							
68	DCI	**PS4.A: Wave Properties** • The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing.							
69	SEP	**Using Mathematics and Computational Thinking** *Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis; a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms; and computational tools for statistical analysis to analyze, represent and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.* • Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations.							
70	CCC	**Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.							
71	PE	**HS-PS4-2. Students who demonstrate understanding can: Evaluate questions about the advantages of using a digital transmission and storage of information.**							
72	DCI	**PS4.A: Wave Properties** • Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses.							
73	SEP	**Asking Questions and Defining Problems** *Asking questions and defining problems in grades 9–12 builds from grades K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.* • Evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set or the suitability of a design.							
74	CCC	**Stability and Change** • Systems can be designed for greater or lesser stability.							
75	CONN	**Influence of Science, Engineering, and Technology on Society and the Natural World** • Modern civilization depends on major technological systems.							
76	CONN	**Influence of Science, Engineering, and Technology on Society and the Natural World** • Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks.							
77	PE	**HS-PS4-3. Students who demonstrate understanding can: Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.**							
78	DCI	**PS4.A: Wave Properties** • Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. (Boundary: The discussion at this grade level is qualitative only; it can be based on the fact that two different sounds can pass a location in different directions without getting mixed up.)							
79	DCI	**PS4.B: Electromagnetic Radiation** • Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features.							
80	SEP	**Engaging in Argument from Evidence** *Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.* • Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments.							

81	**CONN**	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment. The science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.							
82	**CCC**	**Systems and System Models** • Models (e.g., physical, mathematical, and computer models) can be used to simulate systems and interactions — including energy, matter and information flows — within and between systems at different scales.							
83	**PE**	**HS-PS4-4. Students who demonstrate understanding can: Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.**							
84	**DCI**	**PS4.B: Electromagnetic Radiation** • When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells.							
85	**SEP**	**Obtaining, Evaluating, and Communicating Information** *Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs.* • Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible.							
86	**CCC**	**Cause and Effect** • Cause and effect relationships can be suggested and predicted for complex natural and human-designed systems by examining what is known about smaller scale mechanisms within the system.							
87	**PE**	**HS-PS4-5. Students who demonstrate understanding can: Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.**							
88	**DCI**	**PS3.D: Energy in Chemical Processes** • Solar cells are human-made devices that likewise capture the sun’s energy and produce electrical energy.							
89	**DCI**	**PS4.A: Wave Properties** • Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses.							
90	**DCI**	**PS4.B: Electromagnetic Radiation** • Photoelectric materials emit electrons when they absorb light of a high-enough frequency.							
91	**DCI**	**PS4.C: Information Technologies and Instrumentation** • Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them.							
92	**SEP**	**Obtaining, Evaluating, and Communicating Information** *Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs.* • Communicate technical information or ideas (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).							
93	**CCC**	**Cause and Effect** • Systems can be designed to cause a desired effect.							
94	**CONN**	**Interdependence of Science, Engineering, and Technology** • Science and engineering complement each other in the cycle known as research and development (R&D).							
95	**CONN**	**Influence of Engineering, Technology, and Science on Society and the Natural World** • Modern civilization depends on major technological systems.							
Space Systems									
96	**PE**	**HS-ESS1-1. Students who demonstrate understanding can: Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun’s core to release energy in the form of radiation.**							
97	**DCI**	**ESS1.A: The Universe and Its Stars** • The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years.							
98	**DCI**	**PS3.D: Energy in Chemical Processes and Everyday Life** • Nuclear fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation.							
99	**SEP**	**Developing and Using Models** *Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).* • Develop a model based on evidence to illustrate the relationships between systems or between components of a system.							
100	**CCC**	**Scale, Proportion, and Quantity** • The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs.							
101	**PE**	**HS-ESS1-2. Students who demonstrate understanding can: 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.**							
102	**DCI**	**ESS1.A: The Universe and Its Stars** • The study of stars’ light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth.							
103	**DCI**	**ESS1.A: The Universe and Its Stars** • The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe.							

104	**DCI**	**ESS1.A: The Universe and Its Stars** • Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode.							
105	**DCI**	**PS4.B: Electromagnetic Radiation** • Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities.							
106	**SEP**	**Constructing Explanations and Designing Solutions** *Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.* • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, theories, simulations, peer review) and 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.							
107	**CONN**	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.							
108	**CCC**	**Energy and Matter** • Energy cannot be created or destroyed–only moved between one place and another place, between objects and/or fields, or between systems.							
109	**CONN**	**Interdependence of Science, Engineering, and Technology** • Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise.							
110	**CONN**	**Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future.							
111	**CONN**	**Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes the universe is a vast single system in which basic laws are consistent.							
112	**PE**	**HS-ESS1-3. Students who demonstrate understanding can: Communicate scientific ideas about the way stars, over their life cycle, produce elements.**							
113	**DCI**	**ESS1.A: The Universe and Its Stars** • The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth.							
114	**DCI**	**ESS1.A: The Universe and Its Stars** • Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode.							
115	**SEP**	**Obtaining, Evaluating, and Communicating Information** *Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.* • Communicate scientific ideas (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).							
116	**CCC**	**Energy and Matter** • In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved.							
117	**PE**	**HS-ESS1-4. Students who demonstrate understanding can: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.**							
118	**DCI**	**ESS1.B: Earth and the Solar System** • Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system.							
119	**SEP**	**Using Mathematical and Computational Thinking** *Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.* • Use mathematical or computational representations of phenomena to describe explanations.							
120	**CCC**	**Scale, Proportion, and Quantity** • Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth).							
121	**CONN**	**Interdependence of Science, Engineering, and Technology** • Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise.							
History of Earth									
122	**PE**	**HS-ESS1-5. Students who demonstrate understanding can: 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.**							
123	**DCI**	**ESS1.C: The History of Planet Earth** • Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old.							
124	**DCI**	**ESS2.B: Plate Tectonics and Large-Scale System Interactions** • Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history.							
125	**DCI**	**PS1.C: Nuclear Processes** • Spontaneous radioactive decays follow a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials.							

126	SEP	**Engaging in Argument from Evidence** *Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.* • Evaluate evidence behind currently accepted explanations or solutions to determine the merits of arguments.							
127	CCC	**Patterns** • Empirical evidence is needed to identify patterns.							
128	PE	**HS-ESS1-6. Students who demonstrate understanding can: 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.**							
129	DCI	**ESS1.C: The History of Planet Earth** • Although active geologic processes, such as plate tectonics and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Studying these objects can provide information about Earth's formation and early history.							
130	DCI	**PS1.C: Nuclear Processes** • Spontaneous radioactive decays follow a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials							
131	SEP	**Constructing Explanations and Designing Solutions** *Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.* • Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.							
132	CONN	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment, and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.							
133	CONN	**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory.							
134	CCC	**Stability and Change** • Much of science deals with constructing explanations of how things change and how they remain stable.							
135	PE	**HS-ESS2-1.Students who demonstrate understanding can: 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.**							
136	DCI	**ESS2.A: Earth's Materials and Systems** • Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes.							
137	DCI	**ESS2.B: Plate Tectonics and Large-Scale System Interactions** • Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. Plate movements are responsible for most continental and ocean-floor features and for the distribution of most rocks and minerals within Earth's crust.							
138	SEP	**Developing and Using Models** *Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).* • Develop a model based on evidence to illustrate the relationships between systems or between components of a system.							
139	CCC	**Stability and Change** • Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible.							
Earth's Systems									
140	PE	**HS-ESS2-2. Students who demonstrate understanding can: Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.**							
141	DCI	**ESS2.A: Earth's Materials and Systems** • Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes.							
142	DCI	**ESS2.D: Weather and Climate** • The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space.							
143	SEP	**Analyzing and Interpreting Data** *Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.* • Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.							
144	CCC	**Stability and Change** • Feedback (negative or positive) can stabilize or destabilize a system.							
145	CONN	**Influence of Engineering, Technology, and Science on Society and the Natural World** • New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.							
146	PE	**HS-ESS2-3. Students who demonstrate understanding can: Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.**							

147	DCI	**ESS2.A: Earth Materials and Systems** • Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior.							
148	DCI	**ESS2.B: Plate Tectonics and Large-Scale System Interactions** • The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection.							
149	DCI	**PS4.A: Plate Wave Properties** • Geologists use seismic waves and their reflection at interfaces between layers to probe structures deep in the planet.							
150	SEP	**Developing and Using Models** *Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).* • Develop a model based on evidence to illustrate the relationships between systems or between components of a system.							
151	CONN	**Scientific Knowledge is Based on Empirical Evidence** • Science knowledge is based on empirical evidence.							
152	CONN	**Scientific Knowledge is Based on Empirical Evidence** • Science disciplines share common rules of evidence used to evaluate explanations about natural systems.							
153	CONN	**Scientific Knowledge is Based on Empirical Evidence** • Science includes the process of coordinating patterns of evidence with current theory.							
154	CCC	**Energy and Matter** • Energy drives the cycling of matter within and between systems.							
155	CONN	**Interdependence of Science, Engineering, and Technology** • Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise.							
156	NM	**HS-SS-2 NM.** • Construct an argument using claims, scientific evidence, and reasoning that helps decision makers with a New Mexico challenge or opportunity as it relates to science							
Engineering Design									
157	PE	**HS-ETS1-1. Students who demonstrate understanding can: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.**							
158	DCI	**ETS1.A: Defining and Delimiting Engineering Problems** • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.							
159	DCI	**ETS1.A: Defining and Delimiting Engineering Problems** • Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities.							
160	SEP	**Asking Questions and Defining Problems** *Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.* • Analyze complex real-world problems by specifying criteria and constraints for successful solutions.							
161	CONN	**Influence of Science, Engineering, and Technology on Society and the Natural World** • New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.							
162	PE	**HS-ETS1-2. Students who demonstrate understanding can: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.**							
163	DCI	**ETS1.C: Optimizing the Design Solution** • Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.							
164	SEP	**Constructing Explanations and Designing Solutions** *Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.* • Design a solution to a complex real-world problem based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.							
165	PE	**HS-ETS1-3. Students who demonstrate understanding can: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.**							
166	DCI	**ETS1.B: Developing Possible Solutions** • When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.							
167	SEP	**Constructing Explanations and Designing Solutions** *Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.* • Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.							

168	CONN	**Influence of Science, Engineering, and Technology on Society and the Natural World** • New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.							
169	PE	**HS-ETS1-4. Students who demonstrate understanding can: 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.**							
170	DCI	**ETS1.B: Developing Possible Solutions** • Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.							
171	SEP	**Using Mathematics and Computational Thinking** *Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.* • Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems.							
172	CCC	**Systems and System Models** • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy, matter, and information flows — within and between systems at different scales.							

CCSS for ELA/Literacy and Math in Grades 9-12 NGSS
- **NOTE: The standards noted at the end of each CCSS (such as *(HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-5)*) are the occurrences of the CCSS within the NGSS.**

Grades 9-12 CCSS ELA/Literacy									
173	CCSS ELA/ Literacy	**RST.9-10.8** Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. *(HS-PS4-2), (HS-PS4-3), (HS-PS4-4)*							
174	CCSS ELA/ Literacy	**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-PS1-3), (HS-PS1-5), (HS-PS2-1), (HS-PS2-6), (HS-PS3-4), (HS-PS4-2),(HS-PS4-3), (HS-PS4-4), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-5), (HS-ESS1-6), (HS-ESS2-2), (HS-ESS2-3)*							
175	CCSS ELA/ Literacy	**RST.11-12.2** Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. *(HS-ESS2-2)*							
176	CCSS ELA/ Literacy	**RST.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. *(HS-PS4-1), (HS-PS4-4), (HS-ETS1-1), (HS-ETS1-3)*							
177	CCSS ELA/ Literacy	**RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. *(HS-PS4-2), (HS-PS4-3), (HS-PS4-4), (HS-ESS1-5), (HS-ESS1-6), (HS-ETS1-1), (HS-ETS1-3)*							
178	CCSS ELA/ Literacy	**RST.11-12.9** Synthesize information from a range of sources (e. g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (HS-ETS1-1), (HS-ETS1-3)							
179	CCSS ELA/ Literacy	**WHST.9-12.1** Write arguments focused on discipline-specific content. (HS-ESS1-6)							
180	CCSS ELA/ Literacy	**WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. *(HS-PS1-2), (HS-PS1-5), (HS-PS2-6), (HS-PS4-5), (HS-ESS1-2), (HS-ESS1-3), (HS-ESS1-5)*							
181	CCSS ELA/ Literacy	**WHST.9-12.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. *(HS-PS2-3), (HS-PS2-5), (HS-PS3-3), (HS-PS3-4), (HS-PS3-5)*							
182	CCSS ELA/ Literacy	**WHST.11-12.8** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. *(HS-PS1-3), (HS-PS2-5), (HS-PS3-4), (HS-PS3-5), (HS-PS4-4)*							
183	CCSS ELA/ Literacy	**WHST.11-12.9** Draw evidence from informational texts to support analysis, reflection, and research. *(HS-PS2-1)*							
184	CCSS ELA/ Literacy	**SL.11-12.4** Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. *(HS-ESS1-3)*							
185	CCSS ELA/ Literacy	**SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-PS1-4), (HS-PS3-1), (HS-PS3-2), (HS-PS3-5), (HS-ESS2-1), (HS-ESS2-3)*							
Grades 9-12 CCSS Math									
186	CCSS Math	**MP.2** Reason abstractly and quantitatively. *(HS-PS1-5), (HS-PS1-7), (HS-PS2-1), (HS-PS2-2), (HS-PS2-4), (HS-PS3-1), (HS-PS3-2), (HS-PS3-3), (HS-PS3-4), (HS-PS3-5), (HS-PS4-1), (HS-PS4-3), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-3), (HS-ESS1-5), (HS-ESS1-4), (HS-ESS1-6), (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3), (HS-ETS1-3), (HS-ETS1-4)*							

187	**CCSS Math**	**MP.4** Model with mathematics. *(HS-PS1-4),(HS-PS1-8), (HS-PS2-1), (HS-PS2-2), (HS-PS2-4), (HS-PS3-1), (HS-PS3-2), (HS-PS3-3), (HS-PS3-4), (HS-PS3-5), (HS-PS4-1), (HS-ESS1-1), (HS-ESS1-4), (HS-ESS2-1), (HS-ESS2-3), (HS-ETS1-2), (HS-ETS1-3), (HS-ETS1-4)*							
188	**CCSS Math**	**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. *(HS-PS1-2), (HS-PS1-3), (HS-PS1-4), (HS-PS1-5), (HS-PS1-7), (HS-PS1-8), (HS-PS2-1), (HS-PS2-2), (HS-PS2-4), (HS-PS2-5), HS-PS2-6), (HS-PS3-1), (HS-PS3-3), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-4), (HS-ESS1-5), (HS-ESS1-6), (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3)*							
189	**CCSS Math**	**HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. *(HS-PS1-4), (HS-PS1-7), (HS-PS1-8), (HS-PS2-1), (HS-PS2-2), (HS-PS2-4), (HS-PS2-5), (HS-PS2-6), (HS-PS3-1), (HS-PS3-3), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-4), (HS-ESS1-5), (HS-ESS1-6), (HS-ESS2-1), (HS-ESS2-2), (HS-ESS2-3)*							
190	**CCSS Math**	**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. *(HS-PS1-2), (HS-PS1-3), (HS-PS1-4), (HS-PS1-5), (HS-PS1-7), (HS-PS1-8), (HS-PS2-1), (HS-PS2-2), (HS-PS2-4), (HS-PS2-5), (HS-PS2-6), (HS-PS3-1), (HS-PS3-3), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-4), (HS-ESS1-5), (HS-ESS2-1), (HS-ESS2-3)*							
191	**CCSS Math**	**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context. *(HS-PS2-1), (HS-PS2-4), (HS-PS4-1), (HS-PS4-3), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-4)*							
192	**CCSS Math**	**HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. *(HS-PS2-1), (HS-PS2-4), (HS-PS4-1), (HS-PS4-3)*							
193	**CCSS Math**	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. *(HS-PS2-1), (HS-PS2-2)*							
194	**CCSS Math**	**HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. *(HS-PS2-1), (HS-PS2-2), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-4)*							
195	**CCSS Math**	**HSA-CED.A.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *(HS-PS2-1), (HS-PS2-2), (HS-PS4-1), (HS-PS4-3), (HS-ESS1-1), (HS-ESS1-2), (HS-ESS1-4)*							
196	**CCSS Math**	**HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *(HS-ESS1-6)*							
197	**CCSS Math**	**HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. *(HS-PS2-1)*							
198	**CCSS Math**	**HSS-ID.B.6** Represent data on two quantitative variables on a scatter plot, and describe how those variables are related. *(HS-ESS1-6)*							
199	**CCSS Math**	**HSS-IS.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots). *(HS-PS2-1)*							

Section 2: Science Content Review

PUBLISHER/PROVIDER INSTRUCTIONS:

- Publisher/provider citations for this section will refer to the **Teacher Edition (teacher-facing core material)** and/or **Student Edition/Student Workbook (student-facing core material)**. The cited Teacher Edition, Student Edition, and/or Student Workbook should correspond with titles and ISBNs entered on the Form F cover page, whether in print, online, or both. The review set submitted to the summer review institute should also correspond with what is cited on the Form F. If the review set is an online platform only, then that is what should be cited on the Form F and submitted for review by the review teams. If the review set is in print only, then that is what should be cited on the Form F and submitted for review by the review teams.
- For this section, the publisher/provider will enter one citation per criterion (Column C). Each citation should direct the reviewer to a specific location in the materials that best meets the criterion. The citations should be concise and should allow the reviewer to easily determine that all components of the criterion have been met. Each citation should cover no more than 3 pages within the materials.
  - **Column C:** Enter one citation in Column C from either the **Teacher Edition (teacher-facing core material)** OR **Student Edition/Student Workbook (student-facing core material)**. Each citation should direct the reviewer to a specific location in the materials that best meets the criterion.
- The material will be scored for alignment with each criterion as “Meets expectations”, “Partially meets expectations", or “Does not meet expectations” based on the citations provided.
  - **NOTE: You may not use a citation more than once across ALL sections of the rubric.**

Reviewer directions for Science Content Review:		Columns C-F: The publisher/provider will provide a citation from the **Teacher Edition (teacher-facing core material) OR Student Edition/Student Workbook (student-facing core material) (print and/or digital)** for each criterion. Review the cited material and score the material by determining the degree to which it meets the criterion: o M = Meets the criterion o P = Partially meets the criterion o D = Does not meet the criterion Evidence for the publisher citations is required *only* if you score the materials with a D. For your evidence for each criterion that scores a D, choose one of the options from the dropdown menu in Column F. If the reason for scoring the materials with a D is not one of the dropdown options, enter your own evidence statement in the cell in Column F. ***o Each cell in the Score column (column D) will turn purple as you score the materials.***			Columns G-J: Using either the **Teacher Edition (teacher-facing core material) OR Student Edition/Student Workbook (student-facing core material)** (print and/or digital), provide a citation for each criterion that best meets the criterion and addresses all components of the criterion. Review the cited material, score the material by determining the degree to which it meets the criterion, and **provide evidence from the material to support your determination:** o M = Meets the criterion o P = Partially meets the criterion o D = Does not meet the criterion ***o Each cell in the Reviewer Citation column, Score column, and Reviewer Evidence column (columns G, H, and J) will turn purple as you score the materials.***			
Criteria #	**Grade K-12 Science Content Criteria**	Publisher/Provider Citation	Score	If Scored D: Reviewer's Evidence for Publisher Citation	Reviewer Citation	Score	Required: Reviewer's Evidence	Comments, other citations, notes
FOCUS AREA 1: PHENOMENA-/PROBLEM-BASED AND THREE-DIMENSIONAL APPROACH **Instructional materials are centered around high quality phenomena and/or problems and require a three dimensional approach to make sense of the phenomena or to solve the problems.**								
1	Materials clearly integrate and describe the three-dimensional NM STEM Ready! Standards via appropriate grade-band, interdisciplinary progressions that center around the phenomena, utilizing aligned SEPs, CCCs, DCIs and the common core math and ELA standards’ connections.							
2	Materials consistently support meaningful student sensemaking with the three dimensions, including discourse, that is appropriate to grade band progressions, instruction and assessment.							
3	Natural and designed phenomena and/or problems that are meaningful and apparent to students drive coherent lessons and activities in all three dimensions.							
FOCUS AREA 2: THREE-DIMENSIONAL ASSESSMENT **Assessments provide tools, guidance and support for teachers to collect, interpret and act on data about student progress toward the learning goals of the 3 dimensional standards.**								
4	Materials engage students in meaningful tasks as well as multiple assessment types and opportunities, across all dimensions, in order to make sense of phenomena and/or design solutions to problems.							
5	Materials include opportunities for students to obtain feedback from teachers and peers as well as opportunities for student self-reflection.							
FOCUS AREA 3: TEACHER SUPPORTS **Materials include opportunities for teachers to effectively plan and utilize materials.**								
6	Materials provide a comprehensive list of supplies and teacher guidance needed to support instructional activities in a safe manner.							
7	Materials provide teacher guidance for the use of embedded and meaningful technology to support and enhance student learning, when applicable.							
8	Materials and assessments include teacher guidance for students at, approaching, or exceeding grade level expectations.							
9	Materials provide teacher guidance for interpreting student evidence of learning, monitoring student progress and providing feedback to guide student learning and to modify instruction.							
FOCUS AREA 4: STUDENT CENTERED INSTRUCTION **Materials are designed for each student’s regular and active participation in science content.**								
10	Materials provide opportunities to engage students’ curiosity and participation in a way that pulls from their prior knowledge and connects their learning to relevant phenomena and problems.							
11	The flow of lessons from one unit to the next is coherent, meaningful, direct, and apparent to students.							
FOCUS AREA 5: EQUITY **Materials are designed for all learners.**								
12	Materials provide extensions and/or opportunities for all students to engage in learning grade-level/band science and engineering in greater depth.							
13	Materials and assessments are designed in an accessible manner and include multiple ways for all students to build and reflect on science knowledge; multiple ways for all students to access content (Universal Design for Learning); and multiple opportunities for student self-reflection.							

Section 2: All Content Review

PUBLISHER/PROVIDER INSTRUCTIONS:

- The All Content tab will be completed solely by the reviewers. They will score each criterion and provide evidence for their score from the material based on their overall review of the material. You will not provide any citations for this tab.
- The material will be scored for alignment with each criterion as “Meets expectations", “Partially meets expectations", or “Does not meet expectations”.

Reviewer directions for All Content Review:

Columns C-F: The criteria presented on this tab will be scored and evidence provided based on your overall review of the materials. Review the material, score the material by determining the degree to which it meets each criterion, and **provide evidence from the material to support your determination:**

- o M = Meets the criterion
- o P = Partially meets the criterion
- o D = Does not meet the criterion

Your evidence should speak to where in the materials you have found the evidence as well as what is in the materials that supports the score given.

o Each cell in the Score column and the Reviewer's Evidence column (columns C and E) will turn purple as you score the materials.

Criteria #	**All Content Criteria Review**	Score	Required: Reviewer's Evidence from Material	Comments, citations, notes
FOCUS AREA 1: COHERENCE **Instructional materials are coherent and consistent with the New Mexico Content Standards that all students should study in order to be college- and career-ready.**				
1	Instructional materials address the full content contained in the standards for all students by grade level.			
2	Instructional materials support students to show mastery of each standard.			
3	Instructional materials require students to engage at a level of maturity appropriate to the grade level under review.			
4	Instructional materials are coherent, making meaningful connections for students by linking the standards within a lesson and unit.			
FOCUS AREA 2: WELL-DESIGNED LESSONS **Instructional materials take into account effective lesson structure and pacing.**				
5	The Teacher Edition presents learning progressions to provide an overview of the scope and sequence of skills and concepts. The design of the assignments shows a purposeful sequencing of teaching and learning expectations.			
6	Within each lesson of the instructional materials, there are clear, measurable, standards-aligned content objectives.			
7	Within each lesson of the instructional materials, there are clear, measurable language objectives tied directly to the content objectives.			
8	Instructional materials provide focused resources to support students’ acquisition of both general academic vocabulary and content-specific vocabulary.			
9	The visual design of the instructional materials (whether in print or digital) maintains a consistent layout that supports student engagement with the subject.			
10	Instructional materials incorporate features that aid students and teachers in making meaning of the text.			
11	Instructional materials provide students with ongoing review and practice for the purpose of retaining previously acquired knowledge.			
FOCUS AREA 3: RESOURCES FOR PLANNING **Instructional materials provide teacher resources to support planning, learning, and understanding of the New Mexico Content Standards.**				
12	Instructional materials provide a list of lessons in the Teacher Edition (in print or clearly distinguished/ accessible as a teacher's edition in digital materials), cross-referencing the standards addressed and providing an estimated instructional time for each lesson, chapter, and unit.			
13	Instructional materials support teachers with instructional strategies to help guide students’ academic development.			
14	Instructional materials include a teacher edition/ teacher-facing material with useful annotations and suggestions on how to present the content in the student edition/student-facing material and in the supporting material.			

15	Instructional materials integrate opportunities for digital learning, including interactive digital components.			
FOCUS AREA 4: ASSESSMENT **Instructional materials offer teachers a variety of assessment resources and tools to collect ongoing data about student progress related to the standards.**				
16	Instructional materials provide a variety of assessments that measure student progress in all strands of the standards for the content under review. *(Adopted New Mexico Content Standards for 2024: NM STEM Ready Science Standards)*			
17	Instructional materials provide multiple formative and summative assessments, clearly defining which standards are being assessed through content and language objectives.			
18	Instructional materials provide scoring guides for assessments that are aligned with the standards they address, and that offer teachers guidance in interpreting student performance and suggestions for further instruction, differentiation, remediation and/or acceleration.			
19	Instructional materials provide appropriate assessment alternatives for English Learners, Culturally and Linguistically Diverse students, advanced students, and special needs students.			
20	Instructional materials include opportunities to assess student understanding and knowledge of the standards using technology.			
FOCUS AREA 5: EXTENSIVE SUPPORT **Instructional materials give all students extensive opportunities and support to explore key concepts.**				
21	Instructional materials can be customized or adapted to meet the needs of different student populations.			
22	Instructional materials provide differentiated strategies and/or activities to meet the needs of students working below proficiency and those of advanced learners.			
23	Instructional materials provide appropriate linguistic support for English Learners and Culturally and Linguistically Diverse students, and accommodations and modifications for other special populations that will support their regular and active participation in learning content.			
24	Instructional materials provide strategies and resources for teachers to inform and engage parents, family members, and caregivers of all learners about the program and provide suggestions for how they can help support student progress and achievement.			
25	Instructional materials include opportunities for all students that encourage and support critical and creative thinking, inquiry, and complex problem-solving skills.			
FOCUS AREA 6: CULTURAL AND LINGUISTIC PERSPECTIVES **Instructional materials represent a variety of cultural and linguistic perspectives.**				
26	Instructional materials inform culturally and linguistically responsive pedagogy by affirming students' backgrounds in the materials themselves and in the student discussions.			
27	Instructional materials provide a collection of images, stories, and information, representing a broad range of demographic groups, and do not make generalizations or reinforce stereotypes.			
28	Instructional materials provide context, illustrations, and activities for students to make interdisciplinary connections and/or connections to real-life experiences and diverse cultural and linguistic backgrounds.			
FOCUS AREA 7: INCLUSION OF CULTURALLY AND LINGUISTICALLY RESPONSIVE LENS **Instructional materials highlight diversity in culture and language through multiple perspectives.**				
29	Instructional materials include tools and resources to relate the content area appropriately to diversity in culture and language.			
30	Instructional materials include tools and resources that demonstrate multiple perspectives in a specific concept.			

31	Instructional materials engage students in critical reflection about their own lives and societies, including cultures past and present in New Mexico.			
32	Instructional materials address multiple ethnic descriptions, interpretations, or perspectives of events and experiences.			