A Correlation of

Elevate Science

Grade 8, ©2019

To the

Next Generation Science Standards

DCI Arrangement

Pearson

A Correlation of Elevate Science, Grade 8, ©2019
to the
Next Generation Science Standards, DCI Arrangements

Introduction

This document demonstrates how ***Elevate Science ©2019*** meets the Next Generation Science Standards, grades 6-8. Correlation page references are to the Student and Teacher's Editions and cited at the page level.

Pearson is proud to introduce ***Elevate Science*** Middle Grades – where exploration is the heart of science! Designed to address the rigors of new science standards, students will experience science up close and personal, using real-world, relevant phenomena to solve project-based problems. Our newest program prepares students for the challenges of tomorrow, building strong reasoning skills and critical thinking strategies as they engage in explorations, formulate claims, and gather and analyze data that promote evidence-based arguments. The blended print and digital curriculum covers all Next Generation Science Standards at every grade level.

Elevate Science helps teachers transform learning, promote innovation, and manage their classroom.

Transform science classrooms by immersing students in active, three-dimensional learning.
Elevate Science engages students with real-world tasks, open-ended Quests, uDemonstrate performance-based labs, and in the engineering/design process with uEngineer It! investigations.

- A new 3-D learning model enhances best practices.
- Engineering-focused features infuse STEM learning.
- Phenomena-based activities put students at the heart of a Quest for knowledge.

Innovate learning by focusing on 21st century skills.
Students are encouraged to think, collaborate, and innovate! With ***Elevate Science***, students explore STEM careers, experience engineering activities, and discover our scientific and technological world. The content, strategies, and resources of Elevate Science equip the science classroom for scientific inquiry and science and engineering practices.

- Problem-based learning Quests put students on a journey of discovery.
- STEM connections help integrate curriculum.
- Coding and innovation engage students and build 21st century skills.

Manage the classroom with confidence.
Teachers will lead their class in asking questions and engaging in argumentation. Evidence-based assessments provide new options for monitoring student understanding.

- Professional development offers practical point-of-use support.
- Embedded standards in the program allow for easy integration.
- ELL and differentiated instruction strategies help instructors reach every learner.
- Interdisciplinary connections relate science to other subjects.

Designed for today's classroom, preparing students for tomorrow's world. ***Elevate Science*** promises to:

- Elevate thinking.
- Elevate learning.
- Elevate teaching.

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Next Generation Science Standards	Elevate Science Grade 8
MS-PS1 Matter and Its Interactions	
PERFORMANCE EXPECTATION MS-PS1-1.	
Develop models to describe the atomic composition of simple molecules and extended structures.	**SE/TE:** 4–13, 14–15, 16–37, 38–47, 60–63
DISCIPLINARY CORE IDEAS	
PS1.A: Structure and Properties of Matter	
Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.	**SE/TE:** xviii–1, 4–13, 16–28, 38–47, 48–54
Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).	**SE/TE:** xviii–1, 4–13, 16–28, 38–47, 48–54
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop and/or use a model to predict and/or describe phenomena.	**SE/TE:** 4–13, 16–27, 36, 38–47, 60–63
Develop a model to describe unobservable mechanisms.	**SE/TE:** 4–13, 16–27, 36, 38–47, 60–63
CROSSCUTTING CONCEPTS	
Scale, Proportion, and Quantity Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	**SE/TE:** 4–13, 16–27, 38–47

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-PS1-2.	
Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	**SE/TE:** 2, 3, 38, 68–76, 78–88, 92
DISCIPLINARY CORE IDEAS	
PS1.A: Structure and Properties of Matter	
Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.	**SE/TE:** 27, 68–76, 78–88, 99–102
PS1.B: Chemical Reactions	
Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.	**SE/TE:** 27, 68–76, 78–88, 99–102
SCIENCE AND ENGINEEERING PRACTICES	
Analyzing and Interpreting Data Analyze and interpret data to determine similarities and differences in findings.	**SE/TE:** 68–76, 78–88
Connections to Nature of Science Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** 68–76, 78–88
CROSSCUTTING CONCEPTS	
Patterns Macroscopic patterns are related to the nature of microscopic and atomic-level structure.	**SE/TE:** 68–76, 78–88
PERFORMANCE EXPECTATION MS-PS1-3.	
Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	**SE/TE:** 98–105, 106–107, 108, 109

Next Generation Science Standards	Elevate Science Grade 8
DISCIPLINARY CORE IDEAS	
PS1.A: Structure and Properties of Matter	
Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.	**SE/TE:** 27, 82–83, 90, 92, 93, 97–105, 108–109, 112–115
PS1.B: Chemical Reactions	
Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.	**SE/TE:** 27, 82–83, 90, 92, 93, 97–105, 108–109, 112–115
SCIENCE AND ENGINEEERING PRACTICES	
Obtaining, Evaluating, and Communicating Information Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.	**SE/TE:** 98–105
CROSSCUTTING CONCEPTS	
Structure and Function Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.	**SE/TE:** 98–105

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-PS1-5.	
Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.	**SE/TE:** 90–97
DISCIPLINARY CORE IDEAS	
PS1.B: Chemical Reactions	
Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.	**SE/TE:** 90–97
The total number of each type of atom is conserved, and thus the mass does not change.	**SE/TE:** 90– 97
SCIENCE AND ENGINEEERING PRACTICESS	
Developing and Using Models Develop a model to describe unobservable mechanisms.	**SE/TE:** 90–97, 110–111
Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena Laws are regularities or mathematical descriptions of natural phenomena.	**SE/TE:** 90–97, 110–111
Analyzing and Interpreting Data Analyze displays of data to identify linear and nonlinear relationships.	**SE/TE:** 90–97, 110–111
CROSSCUTTING CONCEPTS	
Energy and Matter Matter is conserved because atoms are conserved in physical and chemical processes.	**SE/TE:** 90–97

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-PS1-6.	
Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	**SE/TE:** 66–67, 84, 85
DISCIPLINARY CORE IDEAS	
PS1.B: Chemical Reactions	
Some chemical reactions release energy, others store energy.	**SE/TE:** 66–67, 84, 85, 412, 534, 535
ETS1.B: Developing Possible Solutions	
A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (secondary to MS-PS1-6)	**SE/TE:** 66–67, 84, 85, 412, 534, 535
ETS1.C: Optimizing the Design Solution	
Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (secondary to MS-PS1-6)	**SE/TE:** 66–67, 84, 85, 412, 534, 535
The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (secondary to MS-PS1-6)	**SE/TE:** 66–67, 84, 85, 412, 534, 535
SCIENCE AND ENGINEEERING PRACTICES	
Constructing Explanations and Designing Solutions Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.	**SE/TE:** 66–67, 84, 85, 412, 534, 535
CROSSCUTTING CONCEPTS	
Energy and Matter The transfer of energy can be tracked as energy flows through a designed or natural system.	**SE/TE:** 66–67, 84, 85

Next Generation Science Standards	Elevate Science Grade 8
MS-PS2 Motion and Stability: Forces and Interactions	
PERFORMANCE EXPECTATION MS-PS2-1.	
Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	**SE/TE:** 149, 164–167
DISCIPLINARY CORE IDEAS	
PS2.A: Forces and Motion	
For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law).	**SE/TE:** 118–119, 141, 145–150, 160–161, 164–167
SCIENCE AND ENGINEEERING PRACTICES	
Constructing Explanations and Designing Solutions Apply scientific ideas or principles to design an object, tool, process or system.	**SE/TE:** 149, 164–167
CROSSCUTTING CONCEPTS	
Systems and System Models Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.	**SE/TE:** 149, 164–167
Influence of Science, Engineering, and Technology on Society and the Natural World The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.	**SE/TE:** 149, 164–167

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-PS2-2.	
Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	**SE:** pp. 120–127, 128–137, 138–139, 140–148, 164–167 **TE:** pp. 120–127, 128–137, 138–139, 164–167
DISCIPLINARY CORE IDEAS MS-PS2-2.	
PS2.A: Forces and Motion	
The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion.	**SE/TE:** 120–128, 128–137, 140–148, 155, 340–341
All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared.	**SE/TE:** 120–128, 128–137, 140–148, 155, 340–341
SCIENCE AND ENGINEEERING PRACTICES	
Planning and Carrying Out Investigations Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.	**SE/TE:** p. 120–127, 128–137, 140–148
Connection to Nature of Science Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** p. 120–127, 128–137, 140–148

Next Generation Science Standards	Elevate Science Grade 8
CROSSCUTTING CONCEPTS	
Stability and Change Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales, including the atomic scale.	**SE/TE:** 120–127, 128–137, 140–148, 150–158, 162–163
Cause and Effect Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** 120–127, 128–137, 140–148, 150–158, 162–163
Systems and System Models Models can be used to represent systems and their interactions.	**SE/TE:** 120–127, 128–137, 140–148, 150–158, 162–163

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-PS2-4.	
Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	**SE/TE:** 150–158
DISCIPLINARY CORE IDEAS	
PS2.B: Types of Interactions	
Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.	**SE/TE:** 150–159
SCIENCE AND ENGINEEERING PRACTICES	
Engaging in Argument from Evidence Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.	**SE/TE:** 150–158
Connection to Nature of Science Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** 150–158
CROSSCUTTING CONCEPTS	
Systems and System Models Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.	**SE/TE:** 150–158

Next Generation Science Standards	Elevate Science Grade 8
MS-PS3 Energy	
PERFORMANCE EXPECTATION MS-PS3-2.	
Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.	**SE/TE:** 150–158
DISCIPLINARY CORE IDEAS	
PS3.A: Definitions of Energy	
A system of objects may also contain stored (potential) energy, depending on their relative positions.	**SE/TE:** 128, 150–158, 160–161
PS3.C: Relationship Between Energy and Forces	
When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.	**SE/TE:** 128, 150–158, 160–161
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop a model to describe unobservable mechanisms.	**SE/TE:** 150–158
CROSSCUTTING CONCEPTS	
Systems and System Models Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.	**SE/TE:** 150–158

Next Generation Science Standards	Elevate Science Grade 8
MS-LS3 Heredity: Inheritance and Variation of Traits	
PERFORMANCE EXPECTATION MS-LS3-1.	
Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	**SE/TE:** 182–183, 194–202, 204–215, 281–285
DISCIPLINARY CORE IDEAS	
LS3.A: Inheritance of Traits	
Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits.	**SE/TE:** 185–187, 192, 194–202, 204–215, 226–227, 254–255, 260–261, 265, 281–285, 288, 290–291
LS3.B Variation of Traits	
In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism.	**SE/TE:** 185–187, 192, 194–202, 204–215, 226–227, 254–255, 260–261, 265, 281–285, 288, 290–291
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop and use a model to describe phenomena.	**SE/TE:** 194–202, 204–215

Next Generation Science Standards	Elevate Science Grade 8
CROSSCUTTING CONCEPTS	
Structure and Function Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function.	**SE/TE:** 194–202, 204–215
PERFORMANCE EXPECTATION MS-LS3-2.	
Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	**SE/TE:** 172–181, 182–183, 184–192
DISCIPLINARY CORE IDEAS	
LS3.A: Inheritance of Traits	
Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.	**SE/TE:** 170–181, 184–192, 194, 204–207, 216, 239
LS3.B: Variation of Traits	
In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other.	**SE/TE:** 170–181, 184–192, 194, 204–207, 216, 239
LS1.B: Growth and Development of Organisms	
Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. *(secondary to MS-LS3-2)*	**SE/TE:** 170–181, 184–192, 194, 204–207, 216, 239

Next Generation Science Standards	Elevate Science Grade 8
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop and use a model to describe phenomena.	**SE/TE:** 172–181, 184–192
CROSSCUTTING CONCEPTS	
Cause and Effect Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** 172–181, 184–192
MS-LS4 Biological Evolution: Unity and Diversity	
PERFORMANCE EXPECTATION MS-LS4-1.	
Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	**SE/TE:** 266–279, 302, 304–306, 318, 328, 330–331, 334–337
DISCIPLINARY CORE IDEAS	
LS4.A: Evidence of Common Ancestry and Diversity	
The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.	**SE/TE:** 239, 242, 243, 247, 266–279, 289, 300–302, 304–306, 309–312, 321–325
SCIENCE AND ENGINEEERING PRACTICES	
Analyzing and Interpreting Data Analyze and interpret data to determine similarities and differences in findings.	**SE/TE:** 267–277
Connections to Nature of Science Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** 267–277

Next Generation Science Standards	Elevate Science Grade 8
CROSSCUTTING CONCEPTS	
Patterns Graphs, charts, and images can be used to identify patterns in data.	**SE/TE:** 207, 267–277
Connections to Nature of Science Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.	**SE/TE:** 207, 267–277
PERFORMANCE EXPECTATION MS-LS4-2.	
Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	**SE/TE:** 242, 266–279, 280–288, 310–311, 334–337
DISCIPLINARY CORE IDEAS	
LS4.A: Evidence of Common Ancestry and Diversity	
Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent.	**SE/TE:** 243, 266–279, 280–288, 289, 305, 310–311, 320, 328, 334–337
SCIENCE AND ENGINEEERING PRACTICES	
Constructing Explanations and Designing Solutions Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events.	**SE/TE:** 266–277, 280–288
CROSSCUTTING CONCEPTS	
Patterns Patterns can be used to identify cause and effect relationships.	**SE/TE:** 266–277, 280–288
Connections to Nature of Science Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.	**SE/TE:** 266–277, 280–288

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PERFORMANCE EXPECTATION MS-LS4-3.	
MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	**SE/TE:** 266–277
DISCIPLINARY CORE IDEAS	
LS4.A: Evidence of Common Ancestry and Diversity	
Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy.	**SE/TE:** 266–277
SCIENCE AND ENGINEEERING PRACTICES	
Analyzing and Interpreting Data Analyze displays of data to identify linear and nonlinear relationships.	**SE/TE:** 266–277
CROSSCUTTING CONCEPTS	
Patterns Graphs, charts, and images can be used to identify patterns in data.	**SE/TE:** 266–277

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PERFORMANCE EXPECTATION MS-LS4-4.	
Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	**SE/TE:** 182–183, 238–247, 248–256, 258–265
DISCIPLINARY CORE IDEAS	
LS4.B: Natural Selection	
Natural selection leads to the predominance of certain traits in a population, and the suppression of others.	**SE/TE:** 181, 238–247, 248–256, 258–265, 288, 290–291
SCIENCE AND ENGINEEERING PRACTICES	
Constructing Explanations and Designing Solutions Construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena.	**SE/TE:** 228–229, 238–247, 248–256, 258–265, 266–277
Analyzing and Interpreting Data Analyze displays of data to identify linear and nonlinear relationships.	**SE/TE:** 228–229, 238–247, 248–256, 258–265, 266–277
CROSSCUTTING CONCEPTS	
Cause and Effect Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.	**SE/TE:** 238–247, 248–256, 258–265

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-LS4-5.	
Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	**SE/TE:** 216–225, 248–256
DISCIPLINARY CORE IDEAS	
LS4.B: Natural Selection	
In *artificial* selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring.	**SE/TE:** 181, 216–225, 248–256
SCIENCE AND ENGINEEERING PRACTICES	
Obtaining, Evaluating, and Communicating Information Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.	**SE/TE:** 216–225, 248–256
CROSSCUTTING CONCEPTS	
Cause and Effect: Mechanism and Prediction Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.	**SE/TE:** 177–179, 216–225, 248–256
Connections to Engineering, Technology, and Applications of Science Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.	**SE/TE:** 177–179, 216–225, 248–256

Next Generation Science Standards	Elevate Science Grade 8
Connections to Nature of Science Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.	**SE/TE:** 177–179, 216–225, 248–256
PERFORMANCE EXPECTATION MS-LS4-6.	
Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	**SE/TE:** 248–256, 258–265, 266–277, 280–288
DISCIPLINARY CORE IDEAS	
LS4.C: Adaptation	
Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.	**SE/TE:** 177, 181, 248–256, 258–265, 288
SCIENCE AND ENGINEEERING PRACTICES	
Using Mathematics and Computational Thinking Use mathematical representations to support scientific conclusions and design solutions.	**SE/TE:** 248–256, 258–265, 266–277, 280–288
CROSSCUTTING CONCEPTS	
Cause and Effect Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.	**SE/TE:** 248–256, 258–265

Next Generation Science Standards	Elevate Science Grade 8
MS-ESS1 Earth's Place in the Universe	
PERFORMANCE EXPECTATION MS-ESS1-1.	
Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	**SE/TE:** 428–437, 438–439, 440–448, 450–458, 460–461, 464–467
DISCIPLINARY CORE IDEAS	
ESS1.A: The Universe and Its Stars	
Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.	**SE/TE:** 416–417, 424–425, 428–437, 440–448, 450–458, 460–461, 468–469
ESS1.B: Earth and the Solar System	
This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.	**SE/TE:** 416–417, 424–425, 428–437, 440–448, 450–458, 460–461, 468–469
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop and use a model to describe phenomena.	**SE/TE:** 428–437, 438–439, 440–448, 450–458, 459, 462–463
CROSSCUTTING CONCEPTS	
Patterns Patterns can be used to identify cause and effect relationships.	**SE/TE:** 428–437, 440–448, 450–458
Connections to Nature of Science Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.	**SE/TE:** 428–437, 440–448, 450–458
Systems and System Models Models can be used to represent systems and their interactions.	**SE/TE:** 428–437, 440–448, 450–458

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-ESS1-2.	
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	**SE/TE:** 472–483, 496–505, 506–514, 518–523
DISCIPLINARY CORE IDEAS	
ESS1.A: The Universe and Its Stars	
Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.	**SE/TE:** 429, 430, 445–447, 472–486, 496–505, 506–514, 515–517
ESS1.B: Earth and the Solar System	
The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them.	**SE/TE:** 429, 430, 445–447, 472–486, 496–505, 506–514, 515–517
The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.	**SE/TE:** 429, 430, 445–447, 472–486, 496–505, 506–514, 515–517
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop and use a model to describe phenomena.	**SE/TE:** 472–483, 496–505, 506–514
CROSSCUTTING CONCEPTS	
Systems and System Models Models can be used to represent systems and their interactions.	**SE/TE:** 460–461, 464–467, 472–483, 490–494, 496–505, 506–514
Connections to Nature of Science Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.	**SE/TE:** 460–461, 464–467, 472–483, 490–494, 496–505, 506–514

Next Generation Science Standards	Elevate Science Grade 8
Connections to Engineering, Technology, and Applications of Science The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.	**SE/TE:** 460–461, 464–467, 472–483, 490–494, 496–505, 506–514

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-ESS1-3.	
Analyze and interpret data to determine scale properties of objects in the solar system.	**SE/TE:** 472–483, 484–485, 486–494
DISCIPLINARY CORE IDEAS	
ESS1.B: Earth and the Solar System	
The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them.	**SE/TE:** 429, 430, 445–447, 472–485, 515–517
SCIENCE AND ENGINEEERING PRACTICES	
Analyzing and Interpreting Data Analyze and interpret data to determine similarities and differences in findings.	**SE/TE:** 472–483, 518–519
CROSSCUTTING CONCEPTS	
Scale, Proportion, and Quantity Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	**SE/TE:** 472–483, 486–494, 495, 520–523
Connections to Engineering, Technology, and Applications of Science Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems.	**SE/TE:** 472–483, 486–494, 495, 520–523

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-ESS1-4.	
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.	**SE/TE:** 298–299, 302–309, 310–311, 312–318, 320–328
DISCIPLINARY CORE IDEAS	
ESS1.C: The History of Planet Earth	
The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.	**SE/TE:** 302–309, 312–315, 318, 320–328, 330–331
SCIENCE AND ENGINEEERING PRACTICES	
Constructing Explanations and Designing Solutions Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) 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.	**SE/TE:** 302–309, 312–318, 320–328, 334–337
CROSSCUTTING CONCEPTS	
Scale, Proportion, and Quantity Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	**SE/TE:** 302–309, 312–318, 320–328

Next Generation Science Standards	Elevate Science Grade 8
MS-ESS2 Earth's Systems	
PERFORMANCE EXPECTATION MS-ESS2-6.	
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	**SE/TE:** 342–350, 352–360, 362–369, 370–371, 376–379, 384–392
DISCIPLINARY CORE IDEAS	
ESS2.C: The Roles of Water in Earth's Surface Processes	
Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.	**SE/TE:** 342–350, 352–360, 362–369, 372–373, 384–392, 416–417
ESS2.D: Weather and Climate	
Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns.	**SE/TE:** 342–350, 352–360, 362–369, 372–373, 384–392, 416–417
The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents.	**SE/TE:** 342–350, 352–360, 362–369, 372–373, 384–392, 416–417
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop and use a model to describe phenomena.	**SE/TE:** 342–350, 352–360, 362–369, 374–375, 384–392, 398, 409, 418–423
CROSSCUTTING CONCEPTS	
Systems and System Models Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.	**SE/TE:** 342–350, 352–360, 362–369, 384–392, 406, 410, 414, 446

Next Generation Science Standards	Elevate Science Grade 8
Cause and Effect Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** 342–350, 352–360, 362–369, 384–392, 406, 410, 414, 446
Systems and System Models Models can be used to represent systems and their interactions.	**SE/TE:** 342–350, 352–360, 362–369, 384–392, 406, 410, 414, 446
MS-ESS3 Earth and Human Activity	
PERFORMANCE EXPECTATION MS-ESS3-5.	
Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	**SE/TE:** 394–403, 406–414, 415, 416–417
DISCIPLINARY CORE IDEAS	
ESS3.D: Global Climate Change	
Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.	**SE/TE:** 274–276, 346, 382–383, 394–403, 406–414, 416–417, 459

Next Generation Science Standards	Elevate Science Grade 8
SCIENCE AND ENGINEEERING PRACTICES	
Asking Questions and Defining Problems Ask questions to identify and clarify evidence of an argument.	**SE/TE:** 391, 394–403, 406–414, 420–423
Engaging in Argument from Evidence Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.	**SE/TE:** 391, 394–403, 406–414, 420–423
CROSSCUTTING CONCEPTS	
Stability and Change Stability might be disturbed either by sudden events or gradual changes that accumulate over time.	**SE/TE:** 394–403, 406–414
MS-ETS1 Engineering Design	
PERFORMANCE EXPECTATION MS-ETS1-1.	
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	**SE/TE:** 66–67, 84, 85, 118–119, 382–383, 495, 533
DISCIPLINARY CORE IDEAS	
ETS1.A: Defining and Delimiting Engineering Problems	
The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.	**SE/TE:** 66–67, 84, 85, 118–119, 382–383, 495, 533

Next Generation Science Standards	Elevate Science Grade 8
SCIENCE AND ENGINEEERING PRACTICES	
Asking Questions and Defining Problems Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.	**SE/TE:** 66–67, 84, 85, 118–119, 382–383
CROSSCUTTING CONCEPTS	
Influence of Science, Engineering, and Technology on Society and the Natural World All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.	**SE/TE:** 118–119, 382–383
The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.	**SE/TE:** 118–119, 382–383

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-ETS1-2.	
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	**SE/TE:** 66–67, 84, 85, 106–107, 118–119, 334–337, 340–341, 382–383, 412, 495
DISCIPLINARY CORE IDEAS	
ETS1.B: Developing Possible Solutions	
There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.	**SE/TE:** 66–67, 84, 85, 106–107, 118–119, 334–337, 382–383, 412, 495
SCIENCE AND ENGINEEERING PRACTICES	
Engaging in Argument from Evidence Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.	**SE/TE:** 66–67, 84, 85, 106–107, 118–119, 334–337, 382–383, 495

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-ETS1-3.	
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	**SE/TE:** 66–67, 84, 85, 97, 112–115, 164–167, 225, 230–233, 533, 535
DISCIPLINARY CORE IDEAS	
ETS1.B: Developing Possible Solutions	
There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.	**SE/TE:** 112–115, 412, 533
Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.	**SE/TE:** 112–115, 412, 533
SCIENCE AND ENGINEEERING PRACTICES	
Analyzing and Interpreting Data Analyze and interpret data to determine similarities and differences in findings.	**SE/TE:** 97, 112–115, 164–167, 225, 230–233

Next Generation Science Standards	Elevate Science Grade 8
PERFORMANCE EXPECTATION MS-ETS1-4.	
Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	**SE/TE:** 66–67, 84, 85, 112–115, 118–119, 164–167, 334–337
DISCIPLINARY CORE IDEAS	
ETS1.B: Developing Possible Solutions	
A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4)	**SE/TE:** 112–115, 118–119, 164–167, 334–337, 412, 526, 533–535
Models of all kinds are important for testing solutions. (MSETS1-4)	**SE/TE:** 112–115, 118–119, 164–167, 334–337, 412, 526, 533–535
SCIENCE AND ENGINEEERING PRACTICES	
Developing and Using Models Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.	**SE/TE:** 112–115, 118–119, 164–167, 230–233, 254, 334–337