NGSS CORRELATIONS

GEOLOGICAL PROCESSES

Crosscutting Concepts		Activity number
Cause and Effect	Cause and effect relationships may be used to predict phenomena in natural or designed systems.	3, 4, 5, 9, 10, 11, 14, 15, 16, 17
Energy and Matter	Within a natural system, the transfer of energy drives the motion and/or cycling of matter.	9, 14, 15
	The transfer of energy can be tracked as energy flows through a designed or natural system.	14, 15
Patterns	Patterns can be used to identify cause and effect relationships.	13, 14, 17
	Graphs, charts, and images can be used to identify patterns in data.	1, 6, 7, 8, 10, 12, 16, 17, 18
	Patterns in rates of change and other numerical relationships can provide information about natural and human designed systems.	7, 13, 14, 17
Scale, Proportion, and Quantity	Phenomena that can be observed at one scale may not be observable at another scale.	7, 14, 16
	Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	3, 5, 7, 8, 9, 10, 12, 14, 15
	Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.	7, 12, 13
Stability and Change	Small changes in one part of a system might cause large changes in another part.	9, 14
	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.	3, 10, 11, 12, 13, 14, 15, 16, 17, 18
	Stability might be disturbed either by sudden events or gradual changes that accumulate over time.	3, 7, 9, 10, 11, 12, 13, 15
Structure and Function	Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.	2, 8, 14, 17
	Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.	15

Crosscutting Concepts		Activity number
Systems and System Models	Systems may interact with other systems and be a part of larger complex systems.	6, 9, 15, 17
	Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.	2, 3, 5, 9, 10, 14, 15, 17
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.	7
	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.	4, 7, 18
	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.	1, 16, 17
	Technologies extend the measurement, exploration, modeling, and computational capacity of scientific investigations.	7, 8
Connections to the Nature of Science	Scientists and engineers are guided by habits of mind, such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.	12, 13, 14
	Science assumes that objects and events in natural systems occur in consistent patterns and are understandable through measurement and observation.	6, 8, 12, 13, 14, 15, 16
	Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.	1, 16, 17, 18
	Advances in technology influence the progress of science, and science has influenced advanced in technology.	8
Science and Engineering Practices		**Activity number**
Analyzing and Interpreting Data	Analyze and interpret data to determine similarities and differences in findings.	2, 5, 6, 8, 9, 10, 11, 12, 13, 14, 17, 18
	Construct and interpret graphical displays of data to identify linear and nonlinear relationships.	8
	Analyze and interpret data to provide evidence for phenomena.	1, 6, 7, 9, 12, 13, 14, 15, 16, 17

Science and Engineering Practices		Activity number
Asking Questions and Defining Problems	Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles.	6, 9
	Ask questions to identify and clarify evidence of an argument.	1
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 nature operate today as they did in the past and will continue to do so in the future.	3, 4, 5, 7, 10, 12, 13, 14, 15, 16, 17, 18
	Construct an explanation that includes qualitative or quantitative relationships between variables that predict or describe phenomena.	14
	Apply scientific ideas to construct an explanation for real world phenomena, examples, or events.	12, 13, 14, 15, 16, 17
Developing and Using Models	Develop and use a model to predict and/or describe phenomena.	2, 3, 5, 8, 9, 10, 14, 15, 16, 17, 18
	Develop a model to describe unobservable mechanisms.	2, 8, 15
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.	4,11
	Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon.	12
Obtaining, Evaluating, and Communicating Information	Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings.	4, 13, 16
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.	9
	Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.	2, 5, 10, 14, 17
	Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.	9

Science and Engineering Practices		Activity number
Using Mathematics and Computational Thinking	Apply mathematical concepts and/or processes (e.g., ratio, rate, percent, basic operations, simple algebra) to scientific and engineering questions and problems.	8
	Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends.	6
Connections to the Nature of Science	Scientific knowledge is based on logical and conceptual connections between evidence and explanations.	12, 13, 14, 15, 17
	Science findings are frequently revised and/or reinterpreted based on new evidence.	8, 13, 14
Performance Expectations		**Activity number**
Earth's Systems (ESS2)	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (MS-ESS2-1)	15
	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2)	13
	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (MS-ESS2-3)	14
Earth and Human Activity (ESS3)	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. (MS-ESS3-1)	16, 17
	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2)	18
Disciplinary Core Ideas		**Activity number**
The History of Planet Earth (ESS1.C)	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.	12
	Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.	10, 11, 13, 14

Disciplinary Core Ideas		Activity number
Earth's Materials and Systems (ESS2.A)	All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.	5, 8, 9, 10, 11, 13, 14, 15, 16
	The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.	3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16
Plate Tectonics and Large-Scale System Interactions (ESS2.B)	Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.	10, 12, 13, 14
The Roles of Water in Earth's Surface Processes (ESS2.C)	Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.	2
	Water's movements—both on the land and underground— cause weathering and erosion, which change the land's surface features and create underground formations.	3, 15
Natural Resources (ESS3.A)	Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.	2, 16, 17, 18
Natural Hazards (ESS3.B)	Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.	1, 3, 4, 6, 7, 18

COMMON CORE STATE STANDARDS CORRELATIONS

GEOLOGICAL PROCESSES

Common Core State Standards – English Language Arts		Activity number
Reading in Science and Technical Subjects (RST)	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (RST.6-8.1)	1, 4
	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (RST.6-8.2)	4, 11, 13, 14, 16
	Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks. (RST.6-8.3)	2, 5, 8, 9
	Determine the meaning of symbols, Key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. (RST.6-8.4)	8
	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (RST.6-8.7)	16, 17
Speaking and Listening (SL)	Engage effectively in a range of collaborative discussions (e.g., one-on-one, in groups, teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.8.1)	6. 7, 10, 12, 15, 17
	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound and valid reasoning, and well-chosen details: use appropriate eye contact, adequate volume, and clear pronunciation. (SL.8.4)	7
Writing in History/ Social Studies, Science, and Technological Subjects (WHST)	Write arguments focused on discipline-specific content. (WHST.6-8.1)	11, 12, 16
	Write informative/explanatory texts to examine and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (WHST.6-8.2)	18
	Draw evidence from informational texts to support analysis, reflection, and research. (WHST.6-8.9)	4

Common Core State Standards – Mathematics		Activity number
Mathematical Practice (MP)	Reason abstractly and quantitatively. (MP.2)	1, 14
	Model with mathematics. (MP.4)	7
The Number System (NS)	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/ below sea level, credits/debits, positive/negative electrical charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of zero in each situation. (6.NS.C.5)	7
Ratios and Proportional Reasoning (RP)	Understand the concept of a ratio, and use ratio language to describe a ratio between two quantities. (6.RP.A.1)	8, 12
	Recognize and represent proportional relationships between quantities. (7.RP.A.2)	12