

## NGSS CORRELATIONS

### EVOLUTION

	Crosscutting Concepts	Activity number
Cause and Effect	Cause and effect relationships may be used to predict phenomena in natural or designed systems.	14, 15, 16, 17
	Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.	1, 2, 3, 4, 5, 6, 7, 9, 10, 14, 16, 17
Patterns	Patterns can be used to identify cause and effect relationships.	1, 2, 3, 4, 7, 8, 10, 12, 14, 15
	Graphs, charts, and images can be used to identify patterns in data.	5, 6, 7, 8, 9, 10, 11, 12, 13, 14
Scale, Proportion, and Quantity	The observed function of natural and designed systems may change with scale.	5
Stability and Change	Systems in dynamic equilibrium are stable due to a balance of feedback mechanisms.	14
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.	4, 5, 6, 13,
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, 16
Connections to the Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems	Science assumes that objects and events in natural systems occur in consistent patterns and are understandable through measurement and observation.	1, 2, 7, 9, 10, 11, 12, 13, 14
Connections to the Nature of Science: Science Addresses Questions About the Natural and Material World	Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.	14, 16

Science and Engineering Practices		Activity number
Asking Questions and Defining Problems	Ask questions to determine relationships between independent and dependent variables and relationships in models.	6
	Ask questions that challenge the premise(s) of an argument or the interpretation of a data set.	14
Analyzing and Interpreting Data	Analyze and interpret data to determine similarities and differences in findings.	1, 2, 4, 9, 10, 11, 14
	Construct and interpret graphical displays of data to identify linear and nonlinear relationships.	12, 13
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.	15
	Construct an explanation that includes qualitative or quantitative relationships between variables that predict or describe phenomena.	2, 3, 4, 5, 6, 7
	Apply scientific ideas to construct an explanation for real world phenomena, examples, or events.	8, 9, 11, 12
Developing and Using Models	Develop a model to predict and/or describe phenomena.	1, 2, 4, 5
	Use and/or develop a model of simple systems with uncertain and less predictable factors.	1, 4, 6
Engaging in Argument from Evidence	Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon.	3, 10, 12, 14
	Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.	3
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.	8, 15, 16, 17
	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.	16, 17
	Evaluate data, hypotheses, and/or conclusions in scientific and technical texts in light of competing information or accounts.	16
Using Mathematics and Computational Thinking	Use mathematical representations to describe and/or support scientific conclusions and design solutions.	2, 4, 5, 6
Connections to the Nature of Science: Scientific Knowledge Is Based on Empirical Evidence	Scientific knowledge is based on logical and conceptual connections between evidence and explanations.	9, 10, 11

Disciplinary Core Ideas		Activity number
Interdependent Relationships in Ecosystems (LS2.A)	In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.	2, 4
Inheritance of Traits (LS3.A)	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.	4, 5, 6
Variation of Traits (LS3.B)	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.	3, 4, 5, 6, 7
Evidence of Common Ancestry (LS4.A)	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.	7, 8, 9, 10, 11, 12, 14
	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.	7, 8, 9, 10, 11, 12, 13
	Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy.	12, 13
Natural Selection (LS4.B)	Natural selection leads to the predominance of certain traits in a population, and the suppression of others.	1, 2, 3, 4, 5, 6, 7, 15, 17
	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.	5, 14, 15, 16

	<b>Disciplinary Core Ideas</b>	<b>Activity number</b>
Adaptation (LS4.C)	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.	1, 2, 3, 4, 5, 6, 7, 15, 17
Biodiversity and Humans (LS4.D)	Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling.	14, 16
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.	9, 12
Human Impacts on Earth Systems (ESS3.C)	Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.	14
	Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.	14

Performance Expectations		Activity number
Heredity: Inheritance and Variation of Traits (LS3)	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. (MS-LS3-1)	5
Biological Evolution: Unity and Diversity (LS4)	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. (MS-LS4-1)	11
	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. (MS-LS4-2)	12
	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. (MS-LS4-3)	13
	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. (MS-LS4-4)	4
	Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. (MS-LS4-5)	16
	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. (MS-LS4-6)	6

## COMMON CORE STATE STANDARDS CORRELATIONS

### EVOLUTION

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)	15
	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)	3
	Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks. (RST.6-8.3)	1, 2, 4, 9, 10
	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)	8, 11, 12, 13, 14
	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (RST.6-8.9)	7
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)	5, 6
	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)	5, 6
Writing in History/ Social Studies, Science, and Technological Subjects (WHST)	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)	4, 7, 8, 17
	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (WHST.6-8.8)	16
	Draw evidence from informational texts to support analysis, reflection, and research. (WHST.6-8.9)	3, 14, 15

## COMMON CORE STATE STANDARDS CORRELATIONS

### EVOLUTION (continued)

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Common Core State Standards – Mathematics		Activity number
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)	1, 2, 4, 5, 6
Statistics and Probability (SP)	Summarize numerical data sets in relation to their context. (6.SP.B.5)	1, 2, 4, 5, 6, 11, 12