Sixth Grade Learning Standards

Reading Standards

6R1: Cite textual evidence to support an analysis of what the text says explicitly/implicitly and make logical inferences.
6R2: Determine a theme or central idea of a text and how it is developed by key supporting details over the course of a text; summarize a text
6R3: In literary texts, describe how events unfold, as well as how characters respond or change as the plot moves toward a resolution.
In informational texts, analyze how individuals, events, and ideas are introduced, relate to each other, and are developed.
6R4: Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings. Analyze the impact of specific word choices on meaning, tone, and mood, including words with multiple meanings.
6R5: In literary texts, analyze how a particular sentence, paragraph, stanza, chapter, scene, or section fits into the overall structure of a text and how it contributes to the development of theme/central idea, setting, or plot.
In informational texts, analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and how it contributes to the development of theme/ central ideas.
6R6: Identify the point of view and explain how it is developed and conveys meaning. Explain how an author's geographic location or culture affects his or her perspective.
6R7: Compare and contrast how different formats, including print and digital media, contribute to the understanding of a subject.
6R8: Trace and evaluate the development of an argument and specific claims in texts, distinguishing claims that are supported by reasons and relevant evidence from claims that are not.
6R9: Use established criteria in order to evaluate the quality of texts. Make connections to other texts, ideas, cultural perspectives, eras, and personal experiences.

Writing Standards

6W1: Write arguments to support claims with clear reasons and relevant evidence.

- 6W1a: Introduce a precise claim, acknowledge and distinguish the claim from a counterclaim, and organize the reasons and evidence logically.
- 6W1b: Support claim(s) with clear reasons and relevant evidence, using credible sources while demonstrating an understanding of the topic or text.
- 6W1c: Use precise language and content-specific vocabulary to argue a claim.
- 6W1d: Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.

6W1e: Provide a concluding statement or section that explains the significance of the argument presented.

6W1f: Maintain a style and tone appropriate to the writing task.

6W2: Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

6W2a: Introduce a topic clearly; organize ideas, concepts, and information using strategies such as definition, classification, comparison/contrast, and cause/effect;

6W2b: Develop a topic with relevant facts, definitions, concrete details, quotations, or other information and examples; include formatting, graphics, and multimedia when useful to aid comprehension.

6W2c: Use precise language and domain-specific vocabulary to explain a topic.

6W2d: Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.

6W2e: Provide a concluding statement or section that explains the significance of the information presented.

6W2f: Establish and maintain a style appropriate to the writing task.

6W3: Write narratives to develop real or imagined experiences or events using effective techniques, descriptive details and sequencing

6W3a: Engage the reader by introducing a narrator and/or characters.

6W3b: Use narrative techniques, such as dialogue and description, to develop experiences, events, and/or characters.

6W3c: Use a variety of transitional words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.

6W3d: Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events.

6W3e: Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

6W4: Create a poem, story, play, art work, or other response to a text, author, theme, or personal experience.

6W5: Draw evidence from literary or informational texts to support analysis, reflection, and research. Apply grade 6 Reading standards to both literary and informational text, where applicable.

6W6: Conduct research to answer questions, including self-generated questions, drawing on multiple sources and refocusing the inquiry when appropriate.

6W7: Gather relevant information from multiple sources; assess the credibility of each source; quote or paraphrase the data and conclusions of others; avoid plagiarism and provide basic bibliographic information for sources.

Speaking and Listening

6SL1: Engage effectively in a range of collaborative discussions with diverse partners; express ideas clearly and persuasively, and build on those of others.

6LS1a: Come to discussions prepared, having read or studied required material; draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

6SL1b: Follow norms for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
6SL1c: Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
6SL1d: Consider the ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.
6SL2: Interpret information presented in diverse formats (e.g., including visual, quantitative, and oral) and explain how it relates to a topic, text, or issue under study.
6SL3: Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.
6SL4: Present claims and findings, sequencing ideas logically and using relevant descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear enunciation.
6SL5: Include digital media and/or visual displays in presentations to clarify information and emphasize and enhance main ideas or themes.
6SL6: Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

Language Standards

Please note: Language Standards 1 and 2 are organized within grade bands. For the Core Conventions Skills and Core Punctuation and Spelling Skills for Grades 6-8, the student is expected to know and be able to use the skills by the end of Grade 8. The → is included to indicate skills that connect and progress across the band.

Standard 6L1: Demonstrate command of the conventions of Standard English **grammar and usage** when writing or speaking.

Core Conventions Skills for Grades 6-8:

- Ensure that pronouns are in the proper case (subjective, objective, and possessive).
- Recognize and correct inappropriate shifts in pronoun number and person.
- Recognize and correct pronouns that have unclear or ambiguous antecedents.
- Explain the function of phrases and clauses in general, as well as in specific sentences.
- Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.
- Use simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas.
- Explain the function of verbals (gerunds, participles, infinitives).
- Form and use verbs in the active and passive voice.
- Recognize and correct inappropriate verb shifts.

Standard 6L2: Demonstrate **command of the conventions** of Standard English capitalization, punctuation, and spelling when writing.

Core Punctuation and Spelling Skills for Grades 6-8:

- Use punctuation (commas, parentheses, dashes, hyphens) to clarify and enhance writing.
- Use punctuation (comma, ellipsis, dash) to indicate a pause or break.
- Use an ellipsis to indicate an omission.

6L3: Use knowledge of language and its conventions when writing, speaking, reading, or listening.

6L3a: Vary sentence patterns for meaning, reader/listener interest, and style.

6L3b: Maintain consistency in style and tone.

6L4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies.

6L4a: Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

6L4b: Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).

6L4c: Consult reference materials (e.g., dictionaries, glossaries, thesauruses) to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

6L4d: Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

6L5: Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

6L5a: Interpret figurative language, including personification, in context.

6L5b: Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words.

6L5c: Distinguish among the connotations of words with similar denotations (e.g., stingy, scrimping, economical, unwasteful, thrifty).

6L6: Acquire and accurately use general academic and content-specific words and phrases; apply vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Sixth Grade Math Standards

A. Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0 (b not equal to zero), and use rate language in the context of a ratio relationship. A complex fraction is a fraction that contains another fraction in its numerator and/or denominator:

***Note:** Expectations for unit rates in this grade are limited to non-complex fractions.

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems.

***Note:** Instructionally, students should be exposed to strategies that include but are not limited to the following: tables of equivalent ratios, tape diagrams, double number line, and equations. When solving problems independently, students may utilize a strategy of their choice.

6.RP.A.3a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

6.RP.A.3b Solve unit rate problems. Note: Problems may include unit pricing and constant speed.

6.RP.A.3c Find a percent of a quantity as a rate per 100. Solve problems that involve finding the whole given a part and the percent, and finding a part of a whole given the percent. e.g., 30% of a quantity means 30/100 times the quantity.

6.RP.A.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

*Note: Conversion of units occur within a given measurement system, not across different measurement systems.

B. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions.

***Note:** Instructionally, students should be exposed to strategies that include but are not limited to the following: using visual fraction models, a standard algorithm, and equations to represent the problem. When solving problems independently, students may utilize a strategy of their choice.

C. Compute fluently with multi-digit numbers and find common factors and multiples.

6.NS.B.2 Fluently divide multi-digit numbers using a standard algorithm.

***Note:** This standard is a fluency expectation for grade 6. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Math Standards.

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using a standard algorithm for each operation.

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor other than 1. Find the least common multiple of two whole numbers less than or equal to 12.

D. Apply and extend previous understandings of numbers to the system of rational numbers.

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values. Use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.NS.C.6 Understand a rational number as a point on the number line. Use number lines and coordinate axes to represent points on a number line and in the coordinate plane with negative number coordinates.

6.NS.C.6a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line. Recognize that the opposite of the opposite of a number is the number itself. e.g., with the number 3, – (–3) = 3, and that 0 is its own opposite.
6.NS.C.6b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane. Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
6.NS.C.6c Find and position integers and other rational numbers on a horizontal or vertical number line. Find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

6.NS.C.7a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
6.NS.C.7b Write, interpret, and explain statements of order for rational numbers in real-world contexts.
6.NS.C.7c Understand the absolute value of a rational number as its distance from 0 on the number line. Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
6.NS.C.7d 7d. Distinguish comparisons of absolute value from statements about order.

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of Coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

E. Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.
6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.

6.EE.A.2a Write expressions that record operations with numbers and with letters standing for numbers.
6.EE.A.2b Identify parts of an expression using mathematical terms (term, coefficient, sum, difference, product, factor and quotient); view one or more parts of an expression as a single entity.
6.EE.A.2c Evaluate expressions given specific values for their variables. Include expressions that arise from formulas in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order. (Order of Operations).
*__Note:__ Expressions may or may not include parentheses. Nested grouping symbols are not included.

6.EE.A.3 Apply the properties of operations to generate equivalent expressions.
6.EE.A.4 Identify when two expressions are equivalent. e.g., the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y represents.

F. Reason about and solve one-variable equations and inequalities.

6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or

inequality true.

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem. Understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form x + p = q; x – p = q; px = q; and $\frac{x}{p}$= q for cases in which p, q and x are all nonnegative rational numbers, p≠ 0 and where x represents the unknown quantity.

6.EE.B.8 Write an inequality of the form x > c, x ≥ c, x ≤ c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of these forms have infinitely many solutions; represent solutions of such inequalities on a number line.

G. Represent and analyze quantitative relationships between dependent and independent variables.

6.EE.C.9 9. Use variables to represent two quantities in a real world problem that change in relationship to one another. Given a verbal context and an equation, identify the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

H. Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.A.1 Find area of triangles, trapezoids, parallelograms, and other polygons by composing into rectangles or decomposing into triangles and quadrilaterals; apply these techniques in the context of solving real-world and mathematical problems.

6.G.A.2 Find volumes of right rectangular prisms with fractional edge lengths in the context of solving real world and math problems.

6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices. Use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

6.G.A. 4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

***Note:** Three-dimensional figures include: right rectangular prisms and pyramids and right triangular prisms. When finding surface areas, slant eights for triangles will be given, as well as all necessary edge lengths.

6.G.A.5 5. Use area and volume models to explain perfect squares and perfect cubes.

I. Develop understanding of statistical variability.

6.SP.A.1a. Recognizing that a statistical question is one that anticipates variability in the data related to the question and accounts for it in the answers.

1b. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.

1c. Develop the concept of sampling when collecting data (qualitative or quantitative) from a population and decide the best method to collect data for a particular question.

***Note: Students need to determine when collected data or display of data may be biased.**

6.SP.A.2 Understand that a set of quantitative data collected to answer a statistical question has a distribution which can be described by

its center, spread, and overall shape. Students extend their knowledge of symmetric shapes, to describe data displayed in dot plots and histograms in terms of symmetry. They identify clusters, peaks and gaps, recognizing common shapes and patterns in these displays of data distributions and ask why a distribution takes on a particular shape for the context of the variable being considered.

***Notes:** Students need to determine and justify the most appropriate graph to display a given set of data (pictograph, bar graph, histogram, dot plot).

6.SP.A.3 Recognize that a measure of center for a quantitative data set summarizes all of its values with a single number while a measure of variation describes how its values vary with a single number.

***Note:** Measures of location for describing a center are mean, median and mode. The measure of variation is the range.

J. Summarize and describe distributions.

6.SP.B.4 Display quantitative data in plots on a number line, including dot plots, and histograms.

6.SP.B.5 Summarize numerical data sets in relation to their context, such as by:

6.SP.B.5a Reporting the number of observations.

6.SP.B.5b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

6.SP.B.5c Calculate range and measures of center, as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.

***Note:** Measures of location for describing a center are mean, median and mode. The measure of variation is the range. Role of outliers should be discussed, but no formula required.

6.SP.B.5d Relate the range and the choice of measures of center to the shape of the data distribution and the context in which the data was gathered.

***Note:** Measures of location for describing a center are mean, median and mode. The measure of variation is the range.

K. Investigate chance processes and develop, use and evaluate probability models.

6.SP.C.6 Understand that the probability of a chance event is a number between 0 and 1 inclusive, that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

6.SP.C.7 Approximate the probability of a chance simple event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.

***Note:** Compound events are introduced in grade 7.

6.SP.C.8 8. Develop a probability model and use it to find probabilities of simple events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

6.SP.C.8a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of simple events.

6.SP.C.8b Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.

Sixth Grade S.S. Standards

Grade 6: The Eastern Hemisphere

Grade 6 Social Studies is based on the geography and history of the Eastern Hemisphere, including the development of cultures, civilizations, and empires; interactions between societies; and the comparison of trends in government and economics. It also incorporates some elements of other social sciences. The course begins with an examination of the Eastern Hemisphere today, using geographic skills. This provides the foundation for making connections between the past and the present throughout the course. The remainder of the course is divided into seven Key Ideas that cover a time span from prehistory into the 1300s. Students are provided the opportunity to explore belief systems across time and to examine the foundations of democracy. Teachers should note that some Key Ideas and Concepts may require extra time or attention. These include Key Ideas 6.3 Early River Valley Civilizations in the Eastern Hemisphere; 6.6 Mediterranean World: Feudal Western Europe, the Byzantine Empire, and the Islamic Caliphates; and 6.7 Interactions Across the Eastern Hemisphere.

6.1 The diverse geography of the Eastern Hemisphere has influenced human culture and settlement patterns in distinct ways. Human communities in the Eastern Hemisphere have adapted to or modified the physical environment.

6.1a Maps can be used to represent varied climate zones, landforms, bodies of water, and resources of the Eastern Hemisphere.

6.1b The Eastern Hemisphere can be divided into regions. Regions are areas that share common identifiable characteristics, such as physical, political, economic, or cultural features. Regions within the Eastern Hemisphere include: Middle East (North Africa and Southwest Asia), Sub-Saharan Africa, Europe (West, North, South, Central, and Southeast), Russia and the Independent States Russia, Caucasia, Central Asia, the region of Belarus, Moldova, and Ukraine), East Asia (People's Republic of China, North Korea, South Korea, Japan, and Taiwan), Southeast Asia (Vietnam, Cambodia, Laos, Thailand, Myanmar [Burma], Malaysia, Singapore, Indonesia, Brunei, Philippines), South Asia (Afghanistan, Pakistan, India, Bangladesh, Nepal, Bhutan), Oceania (Australia, New Zealand, the Pacific)

6.1c The physical environment influences human population distribution, land use, economic activities, and political connections.

6.1d Issues and problems experienced in the regions of the Eastern Hemisphere have roots in the past.

6.2 The first humans modified their physical environment as well as adapted to their environment.

6.2a Human populations that settled along rivers, in rainforests, along coastlines, in deserts, and in mountains made use of the resources and the environment around them in developing distinct ways of life.

6.2b Early peoples in the Eastern Hemisphere are often studied by analyzing artifacts and archaeological features. Archaeologists engage in digs and study artifacts and features in a particular location to gather evidence about a group of people and how they lived at a particular time.

6.2c The Neolithic Revolution was marked by technological advances in agriculture and domestication of animals that allowed people to form semi-sedentary and sedentary settlements.

6.2d Historians use archaeological and other types of evidence to investigate patterns in history and identify turning points. A turning point

can be an event, era, and/or development in history that has brought about significant social, cultural, ecological, political, or economic change.

6.3 Complex societies and civilizations developed in the Eastern Hemisphere. Although these complex societies and civilizations have certain defining characteristics in common, each is also known for unique cultural achievements and contributions. Early human communities in the Eastern Hemisphere adapted to and modified the physical environment.

6.3a Humans living together in settlements develop shared customs, beliefs, ideas, and languages that give identity to the group.

6.3b Complex societies and civilizations share the common characteristics of religion, job specialization, cities, government, language/record keeping system, technology, and social hierarchy. People in Mesopotamia, the Yellow River valley, the Indus River valley, and the Nile River valley developed complex societies and civilizations.

6.3c Mesopotamia, Yellow River valley, Indus River valley, and Nile River valley complex societies and civilizations adapted to and modified their environment to meet the needs of their population.

6.3d Political and social hierarchies influenced the access that groups and individuals had to power, wealth, and jobs and influenced their roles within a society.

6.4 Major religions and belief systems developed in the Eastern Hemisphere. There were important similarities and differences between these belief systems.

6.4a Civilizations and complex societies developed belief systems and religions that have similar, as well as different, characteristics.

6.4b Belief systems and religions are based on sets of mutually held values.

6.4c Belief systems and religions often are used to unify groups of people, and may affect social order and gender roles.

6.5 As complex societies and civilizations change over time, their political and economic structures evolve. A golden age may be indicated when there is an extended period of time that is peaceful, prosperous, and demonstrates great cultural achievements.

6.5a Geographic factors influence the development of classical civilizations and their political structures.

6.5b Political structures were developed to establish order, to create and enforce laws, and to enable decision making.

6.5c A period of peace, prosperity, and cultural achievements may be indicative of a golden age.

6.6 The Mediterranean world was reshaped with the fall of the Roman Empire. Three distinct cultural regions developed: feudal Western Europe, the Byzantine Empire, and the Islamic caliphates. These regions interacted with each other and clashed over control of holy lands.

6.6a Overexpansion, corruption, invasions, civil wars, and discord led to the fall of Rome. Feudalism developed in Western Europe in reaction to a need for order and to meet basic needs.

6.6b The Byzantine Empire preserved elements of the Roman Empire, controlled lands within the Mediterranean basin, and began to develop Orthodox Christianity.

6.6c Islam spread within the Mediterranean region from southwest Asia to northern Africa and the Iberian Peninsula.

6.6d Competition and rivalry over religious, economic, and political control over holy lands led to conflict such as the Crusades.

6.7 Trade networks promoted the exchange and diffusion of language, belief systems, tools, intellectual ideas, inventions, and diseases.

6.7a The Silk Roads, the Indian Ocean, and the Trans-Saharan routes formed the major Afro-Eurasian trade networks connecting the East

and the West. Ideas, people, technologies, products, and diseases moved along these routes.
6.7b The Mongol conquests in Eurasia fostered connections between the East and the West, and the Mongols served as important agents of change and cultural diffusion.
6.7c Complex societies and civilizations adapted and designed technologies for transportation that allowed them to cross challenging landscapes and move people and goods efficiently.

Sixth Grade Science Standards

Space Systems

- 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.
- MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
- MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.

History of Earth

- 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.
- MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying temporal and spatial scales.
- MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Earth's Systems

- MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
- MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the Sun and the force of gravity.
- MS-ESS3-1 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 geologic processes.

Weather and Climate

- MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

- MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
- MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Human Impacts

- MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
- MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Engineering Design

- 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.
- MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- 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.
- 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.