Science

Curriculum Framework

K – 12

Approved 7/016
Revised with new course, Science of Natural Disasters, 6/2017

Philosophy

There is no doubt that science—and, therefore, science education—is central to the lives of all Americans. Never before has our world been so complex and science knowledge so critical to making sense of it all. When comprehending current events, choosing and using technology, or making informed decisions about one's healthcare, science understanding is key. Science is also at the heart of the United States' ability to continue to innovate, lead, and create the jobs of the future. All students—whether they become technicians in a hospital, workers in a high tech manufacturing facility, or Ph.D. researchers—must have a solid K–12 science education.

Through a collaborative, state-led process, new K–12 science standards have been developed that are rich in content and practice and arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education. The Next Generation Science Standards are based on the Framework for K–12 Science Education developed by the National Research Council.

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Science Instructional Practices

- This curriculum framework is based upon three main science competencies focused upon science concepts, scientific inquiry, and core science ideas. Core ideas of physical science, earth/space science and life science are each integrated into science for kindergarten through grade 5. Courses for grades 6 through high school each focus on one specific branch of science.

- Safety requirements shall be clearly delineated and assessed based upon common grade level/course expectations.

- Each science classroom will prominently display the appropriate grade level Science Inquiry Processes poster.

- Each student will have a science notebook with graph-lined pages and spacing appropriate for the developmental level of the student. The science notebook supports student inquiry, strengthens communication skills, and develops authentic science practices.

- Inquiry investigations shall be assessed using the common Scientific Inquiry Criteria. (See Appendix) Teams and departments shall create common analytical rubrics appropriate for student developmental levels. Teachers may design graphic organizers/worksheets based upon the criteria, appropriate for students and tasks.

- An appropriately strong background in measurement is important to student success in science.

- Pacing Guides should be reviewed regularly for alignment with the most current science curriculum framework and approved instructional units, including review at the end of each school year in order to make revisions for the following school year.

- Science Curriculum Documents can be found in the Z-drive/Curriculum/Science.

- Reading and writing shall conform to the College and Career Ready literacy standards. (see Appendix)

1. Competency: Apply recurring **science concepts.**

Science Concepts:	Indicators:
Cause and Effect	Students will investigate, explain, and evaluate potential causal relationships by using evidence to support claims and predictions about the mechanisms that drive those relationships.
Energy and Matter	Students will analyze evidence from a variety of sources (investigations, models) to predict, connect and/or evaluate the cycling of matter and flow of energy within and between systems in order to understand, describe, or predict possibilities and limitations of systems.
Patterns	Students will observe and describe patterns in natural and human designed phenomena and use those patterns to support claims about the observed or predicted relationships among phenomena.
Scale, Proportion, and Quantity	Students will describe and represent the significance of changes in observable and non-observable phenomena in terms of relative scale, proportion, and quantity.
Science and Society	Students will identify the reciprocal relationship between science, engineering, and society. Students should understand that human activity draws on natural resources which has both short and long term consequences, positive as well as negative, for the health of people and the natural environment.
Stability and Change	Students will investigate and analyze static and dynamic conditions of natural and human designed systems in order to explain and predict changes over time.
Structure and Function	Students will use evidence to support claims about the relationship among structure and function of natural and human designed objects.

Systems and System Models	Students will investigate and analyze a natural or human designed system in terms of its boundaries, inputs, outputs, interactions, and behaviors and use this information to develop a system model that can be used to understand and empirically evaluate the accuracy of models in terms of representing the underlying system.

2. Competency: Apply **scientific inquiry** to solve authentic problems and demonstrate science literacy.

Inquiry Processes:	Indicators:
Analyze and interpret data	Grades K-2: Students will collect, record, and share observations. Grades 3-5: Students will use quantitative approaches to collect data and conduct multiple trials of qualitative observations. Grades 6-8: Students will incorporate qualitative and quantitative analysis in investigations, distinguish between correlation and causation, and utilize basic statistical techniques of data and error analysis. Grades 9-12: Students will utilize more detailed statistical analysis, compare data sets for consistency, and use models to generate and analyze data.
Ask questions and define problems	Grades K-2: Students will ask simple, descriptive questions based on observations to find out more information. Grades 3-5: Students will ask questions that can be investigated and predict reasonable outcomes based on patterns, such as cause and effect relationships. Grades 6-8: Students will propose and ask questions to identify and clarify the relationships between variables, evidence of an argument, and models. Grades 9-12: Students will formulate, refine, and evaluate empirically testable questions and design problems using models and simulations.
Construct explanations and design solutions	Grades K-2: Students will use tools and materials to construct explanations and design solutions. Grades 3-5: Students will identify variables and use evidence to explain and predict scientific phenomena in order to design multiple solutions. Grades 6-8: Students will construct explanations and design solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories. Grades 9-12: Students will design, evaluate, and/or refine a solution to a complex, real-world problem, based on scientific ideas, principles, and theories.

Develop and utilize models	Grades K-2: Students will use and develop models that represent concrete events or design solutions. Grades 3-5: Students will use and develop models that represent or describe scientific principles. Grades 6-8: Students will use, develop, and revise models to describe, test, and predict abstract scientific phenomena and design systems. Grades 9-12: Students will use, synthesize, and develop models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
Engage in argument from evidence	Grades K-2: Students will use experiences to compare ideas about the natural world in order to engage in argument from evidence. Grades 3-5: Students will critique scientific explanations and/or solutions proposed by peers by citing relevant evidence. Grades 6-8: Students will construct and present oral or written arguments, supported by evidence and scientific reasoning, to support or refute an explanation, model, or solution to a problem. Grades 9-12: Students will evaluate the claims, evidence, and scientific reasoning behind currently accepted explanations or solutions to determine merits of arguments. Students will also utilize this information to propose new claims, ideas, and experiments.
Obtain, evaluate, and communicate information	Grades K-2: Students will use texts and observations to obtain, evaluate, and communicate new information. Grades 3-5: Students will evaluate the merit and accuracy of ideas and methods by obtaining and combining information from books and other reliable media. Grades 6-8: Students will examine and synthesize information, utilizing a variety of reliable sources, to assess the credibility, accuracy, and possible bias of each publication, methods used, and how they are or are not supported by evidence. Grades 9-12: Students will evaluate the validity and reliability of multiple scientific claims, verifying the data when possible, in order to communicate technical information and ideas in multiple formats.

Plan and carry out investigations	Grades K-2: Students will plan and conduct investigations to answer questions or test solutions to problems. Grades 3-5: Students will investigate variables, including controls, and provide evidence to support explanations or solutions. Grades 6-8: Students will plan investigations and evaluate experimental designs, identifying the independent, dependent, and control variables, in order to produce data to serve as evidence to support or refute the hypothesis of their investigation. Grades 9-12: Students will plan and conduct investigations to produce data to serve as evidence and in the design, decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations of the precision of data, refining the experiment design accordingly.
Use mathematical and computational thinking	Grades K-2: Students will measure a variety of physical properties and use mathematics to make comparisons. Grades 3-5: Students will use computations and mathematics to analyze quantitative data and compare results. Grades 6-8: Students will use mathematical representations to describe and/or support scientific conclusions and design solutions. Grades 9-12: Students will use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations.

3. – 6. Apply science core ideas within physical science, earth and space science, and life science.

(See related competencies by grade level)

Physical Science:

PS1 - Matter and Its Interactions

PS2 - Motion and Stability: Forces and Interactions

PS3 - Energy

PS4 - Waves and their Applications in Technologies for Information Transfer

Earth/Space Science:

ESS1 - Earth's Place in the Universe

ESS2 - Earth's Systems

ESS3 - Earth and Human Activity

Life Science:

LS1 - From Molecules to Organisms: Structures and Processes

LS2 - Ecosystems: Interactions, Energy, and Dynamics

LS3 - Heredity: Inheritance and Variation of Traits

LS4 - Biological Evolution: Unity and Diversity

Kindergarten

Competencies:	Indicators:
3. Investigate then construct evidence-based explanations about **physical** interactions.	Motion and Stability: Forces and Interactions K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. Energy K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
4. Investigate then construct evidence-based explanations about **Earth**'s systems and Earth's place in the universe.	Earth's Systems K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. Earth and Human Activity K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
5. Investigate then construct evidence-based explanations about **plants and animals**, including humans.	From Molecules to Organisms: Structures and Processes K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

Grade 1:

Competencies:	Indicators:
3. Investigate then construct evidence-based explanations about **physical** interactions.	Waves and their Applications in Technologies for Information Transfer 1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. 1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated. 1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. 1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.
4. Investigate then construct evidence-based explanations about **Earth**'s place in the universe and its systems.	Earth's Place in the Universe 1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. 1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.
5. Investigate then construct evidence-based explanations about **plants and animals**, including humans.	From Molecules to Organisms: Structures and Processes 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. 1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. Heredity: Inheritance and Variation of Traits 1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Grade 2:

Competencies:	Indicators:
3. Investigate then construct evidence-based explanations about **physical** interactions.	Matter and Its Interactions 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. 2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. 2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. 2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
4. Investigate then construct evidence-based explanations about **Earth**'s place in the universe and its systems.	Earth's Place in the Universe 2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly. Earth's Systems 2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. 2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. 2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.
5. Investigate then construct evidence-based explanations about **plants and animals**, including humans.	Ecosystems: Interactions, Energy, and Dynamics 2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. 2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants

Grade 3:

Competencies:	Indicators:
3. Analyze and develop evidence-based understanding about the **physical** properties and interactions of matter, energy, and waves.	Motion and Stability: Forces and Interactions 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. 3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. 3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. 3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.
4. Analyze and develop evidence-based understanding about **Earth**'s place in the universe and its systems.	Earth's Systems 3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. 3-ESS2-2. Obtain and combine information to describe climates in different regions of the world. Earth and Human Activity 3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.
5. Analyze and develop evidence-based understanding about the structure, interactions, and variation of **plants** and **animals**, including humans.	From Molecules to Organisms: Structures and Processes 3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. Ecosystems: Interactions, Energy, and Dynamics LS2-1. Construct an argument that some animals form groups that help members survive. Heredity: Inheritance and Variation of Traits 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.

Grade 4:

Competencies:	Indicators:
3. Analyze and develop evidence-based understanding about the **physical** properties and interactions of matter, energy, and waves.	Energy 4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. 4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. 4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide. 4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. Waves and their Applications in Technologies for Information Transfer 4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. 4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
4. Analyze and develop evidence-based understanding about **Earth**'s place in the universe and its systems.	Earth's Place in the Universe 4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. Earth's Systems 4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. 4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.

	Earth and Human Activity 4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. 4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
5. Analyze and develop evidence-based understanding about the structure, interactions, and variation of **plants and animals**, including humans.	From Molecules to Organisms: Structures and Processes 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. 4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

Grade 5:

Competencies:	Indicators:
3. Analyze and develop evidence-based understanding about the **physical** properties and interactions of matter, energy, and waves.	Matter and Its Interactions 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. 5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. 5-PS1-3. Make observations and measurements to identify materials based on their properties. 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances. Motion and Stability: Forces and Interactions 5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. Energy 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.
4. Analyze and develop evidence-based understanding about Earth's place in the universe and its systems.	Earth's Systems Explain the cycling of water through the Earth's systems driven by energy from the sun and the forces of gravity. Describe interactions with air masses and resultant changes in weather conditions based upon data collected with basic weather instruments. 5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. 5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

	Earth and Human Activity 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
5. Analyze and develop evidence-based understanding about the structure, interactions, and variation of **plants and animals**, including humans.	From Molecules to Organisms: Structures and Processes LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. Ecosystems: Interactions, Energy, and Dynamics LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Grade 6 – Earth/Space Science

Competencies:	Indicators:
3. Demonstrate and apply evidence-based understanding about **Earth's place in the Universe**.	5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. 5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. 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. 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.
4. Demonstrate and apply evidence-based understanding about **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-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time 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. 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-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 the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

5. Demonstrate and apply evidence-based understanding about the relationship between **human activity and the Earth.**	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 geoscience processes. 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. MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Grade 7 – Life Science

Competencies:	Indicators:
3. Apply evidence-based understanding about the structures and processes of life from **molecules to organisms**.	From Molecules to Organisms: Structures and Processes MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
4. Apply evidence-based understanding about **ecosystems**.	MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

5. Apply evidence-based understanding about **inheritance and variation of traits**.

Heredity: Inheritance and Variation of Traits

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.

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.

6. Apply evidence-based understanding about **unity and the diversity of life**.

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

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.

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.

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.

MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

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.

Grade 8 – Physical Science

Core Ideas:	Indicators:
3. Apply evidence-based understanding about **matter and its interactions**.	MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures. Identify patterns in the periodic table. 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. Investigate the similarities and difference between ionic and covalent bonding. MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. 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. MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
4. Apply evidence-based understanding about **force and motion**.	MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. 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. MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. 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. MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

5. Apply evidence-based understanding about **energy** transfer and conservation.	MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. 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. MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
6. Apply evidence-based understanding about **waves** and their applications.	MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

Freshman Science	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Earth's Place in the Universe** and **Interactions of Matter.**	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. Communicate scientific ideas about the way stars, over their life cycle, produce elements. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

4. Apply evidence-based understanding of **Interactions of Forces and Motion** within **Earth's Systems.**	Develop models to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental/ ocean-floor features and cycle matter by thermal convection. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.

5. Apply evidence-based understanding of **Earth Systems, Energy Use, and Human Activity.**	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Biology	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **How Biological Systems use Energy and Matter to Maintain Life.**	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
4. Apply evidence-based understanding of **How Biological Systems Interact to Produce Complex Properties.**	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity

5. Apply evidence-based understanding of how **Biological Information Essential to Life Processes**.	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
6. Apply evidence-based understanding of **Biological Evolution: Unity and Diversity.**	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. Construct an explanation based on evidence for how natural selection leads to adaptation of populations. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

Chemistry:	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Matter and Its Interactions.**	Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
4. Apply evidence-based understanding of **Energy and Electromagnetic Radiation**.	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

Physics:	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Forces and Motion**.	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.
4. Apply evidence-based understanding of **Electricity and Magnetism.**	Create a computational model to model resistance in a complex circuit. Develop and use models to illustrate how electrical energy is transferred between reactive components such as capacitors and inductors. Design, build, and refine a device that works within given constraints to convert one form of electrical energy into another form of energy. Plan and conduct an investigation to provide evidence that a mechanical force can be obtained from electromagnetic forces. Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.
5. Apply evidence-based understanding of **Vibrations and Waves.**	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. Evaluate and demonstrate how microwave oven work and use it to measure the speed of light and the wavelength of the microwave radiation and why the oven uses a rotating plate.

	Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.
6. Apply evidence-based understanding of **Atomic Theory.**	Evaluate the claims, evidence and reasoning behind the standard model of quantum mechanics and general theory of relativity vs string theory Communicate technical information about the use of atomic theory and medicine. Use mathematical representations to demonstrate the relationship between solid state band structure and current flow in a solid state diode.

Human Anatomy & Physiology:	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **How Biological Systems Use Energy and Matter to Maintain Life.**	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. Analyze how transport, absorption, and excretory systems work together to maintain homeostasis and health within the human body.
4. Apply evidence-based understanding of how **Biological Information Essential to Life Processes**.	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. Describe the structures and functions that allow the human body to integrate and coordinate both internal and external information in order to maintain life and support health.
5. Apply evidence-based understanding of **How Biological Systems Interact to Produce Complex Properties.**	Develop and use a model to illustrate the hierarchical organization of the human body and the interacting systems that provide specific functions to maintain health Analyze how the immune system coordinates with other systems to protect the human body from disease. Evaluate the claims, evidence, and reasoning that the complex interactions in human body systems maintain relatively consistent and stable conditions, and changes in those conditions may result in disease.

Environmental Science:	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Earth's Systems.**	Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. Use a model to illustrate how photosynthesis transforms light energy into chemical energy, and describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
4. Apply evidence-based understanding of **Earth and Human Activity.**	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources, and create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
5. Apply evidence-based understanding of Interactions of **Biological Systems that Produce Complex Properties.**	Use mathematical and/or computational representations to support and revise explanations based on evidence about factors affecting biodiversity, carrying capacity, and populations in ecosystems of different scales. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Forensics:	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Biological Information.**	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. Construct and revise an explanation for the outcome of a simple blood test to identify individuals Ask questions to clarify relationships about the role of DNA in coding the instructions for characteristic traits passed from parents to offspring. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
4. Apply evidence-based understanding of **Matter and Its Interactions.**	Use mathematical representations to support the claim that the total momentum of a fluid is maintained and that this is represented in impact angle Construct and revise an explanation for the outcome of a simple chemical reaction based on the analysis of common materials found in a crime scene. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.
5. Apply evidence-based understanding of **Motion and Forces.**	Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

Astrobiology:	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Earth's Place in the Universe and Space Systems.**	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. Communicate scientific ideas about the way stars, over their life cycle, produce elements. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
4. Apply evidence-based understanding of **Earth's Systems as a Model for Other Planets.**	Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

5. Apply evidence-based understanding of **Interactions within Earth's Ecosystems and Human Activity.**	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity, carrying capacity, and populations in ecosystems of different scales. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy among organisms in an ecosystem including aerobic and anaerobic conditions. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources; evaluate the evidence human behavior on individual and species' chances to survive and reproduce. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Principles of Engineering	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Engineering Problems and Solutions.**	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
4. Apply evidence-based understanding of **Earth and Human Activity.**	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
5. Apply evidence-based understanding of **Matter, Energy, and their Interactions.**	Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
6. Apply evidence-based understanding of **Motion and Forces**.	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

Biomedical Science	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Biological Interactions and Complex Properties.**	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. Determine the cause of death by investigating the many aspects of the medical condition of a victim, the internal and external examination of the body, and the chemical and microscopic analysis of tissues and body fluids. Investigate how the human heart is a four-chambered muscular pump designed to provide the force needed to transport blood through all the tissues of the body and Explain how the structure of blood vessels relates to their overall function
4. Apply evidence-based understanding of how **Biological Information Essential to Life Processes**.	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells Use gel electrophoresis separate DNA fragments and analyze Restriction Fragment Length Polymorphism (RFLP). Explain how Human DNA is a unique code that provides a genetic blueprint of an individual. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. Analyze how chromosomes transfer genetic material from cell to cell as well as from generation to generation, in processes called mitosis and meiosis.
5. Apply evidence-based understanding of **How Biological Systems use Energy and Matter to Maintain Life.**	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. Explain the causes of diabetes and the effect of the disease on the overall health of the individual as well as how it causes significant complications in many human body systems. Model the appropriate record keeping that scientists need to make sure that what they present is accurate and is communicated in a way that keeps interest and focus. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy, and how that chemical energy is processed within the human body to maintain health.

6. Apply evidence-based understanding of **Biological Evolution: Unity and Diversity.**	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. Focus on sickle cell disease which is caused by an abnormal type of hemoglobin which causes red blood cells to become shaped like crescents or sickles. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. Recognize that chromosomes in reproductive cells contain numerous genes that carry traits through the generations Construct an explanation based on evidence for how natural selection leads to adaptation of populations. Recognize that in order for cellular division to occur, exact copies of the DNA must be transferred to the resulting daughter cells.

Science of Natural Disasters	
Competency:	**Indicators:**
3. Apply evidence-based understanding of **Biological Interactions and Complex Properties.**	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
4. Apply evidence-based understanding of **Earth Systems, Energy Use, and Human Activity.**	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
5. Apply evidence-based understanding of **Earth's Place in the Universe; and Interactions of Matter, Forces, and Motion** within **Earth's Systems.**	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. Communicate scientific ideas about the way stars, over their life cycle, produce elements. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

	Develop models to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental/ ocean-floor features and cycle matter by thermal convection. Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.

APPENDIX

Next Generation Science Standards Model:

http://www.nextgenscience.org/next-generation-science-standards

Next Generation Science Standards:

http://www.nextgenscience.org/sites/ngss/files/NGSS%20DCI%20Combined%2011.6.13.pdf

Scientific Inquiry Criteria

Inquiry Criteria Descriptions

Title: Clear and concise.

Question/Problem: The question/problem might be assigned to you, or you might have to come up with one of your own, research and observe at this point, and add your findings after the question. Why did you chose this problem if it was left up to you?

Hypothesis: A hypothesis is a reasonable prediction about how things work. Sometimes a hypothesis is written like this: "If _____[I do this] _____, then _____[this]_____ will happen." Be certain that the question/hypothesis can be answered/tested using data gathered in a scientific investigation. In other words, you need to be able to measure both "what you do" and "what will happen." Use your prior knowledge/life experiences to help inform your hypothesis as appropriate.

Materials List: Every item should be listed including the exact quantity of each item. Make note of any quantities that you increase or decrease as you carry out the experiment.

Procedure: Number the steps in your procedures. Write each step clearly and concisely so that another person may accurately duplicate your procedure; reproducibility is important for your experiment findings to be valid. Make sure you identify both the independent and dependent variable, and controlled variable(s).

Observations: Record all data accurately. Include qualitative observations in narrative form. Include data table(s) as appropriate for collecting quantitative data. (Graphs of results do not go here; they go into analysis.)

Analysis: Transform your data into graph(s) to look for patterns and trends. Explain what happened to the dependent variable when the independent variable was altered? Explain results, patterns, trends, and relationships using scientific knowledge.

Conclusion: State whether your hypothesis was confirmed or refuted. Explain what you learned from this investigation using the data. Describe some possible errors in your data that may have kept you from getting more accurate results. Explain what you would change in the procedures before repeating the inquiry. List new questions to investigate based on your results.

Inquiry Assessment Components

Title: **Question/Problem**:

Hypothesis: Materials

List: Procedure:

Observations: Analysis:

Conclusion:

STANDARDS FOR

Literacy in History/Social Studies, Science, and Technical Subjects

6–12

College and Career Readiness Anchor Standards for Reading

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see "Research to Build and Present Knowledge" in Writing for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

Note on range and content of student reading

Reading is critical to building knowledge in history/social studies as well as in science and technical subjects. College and career ready reading in these fields requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in history and science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. In history/social studies, for example, students need to be able to analyze, evaluate, and differentiate primary and secondary sources. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.

Reading Standards for Literacy in History/Social Studies 6–12

RH

The standards below begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of primary and secondary sources.	1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.	1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.
2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.	2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.	2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.
3. Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).	3. Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.	3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.	4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social studies.	4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).
5. Describe how a text presents information (e.g., sequentially, comparatively, causally).	5. Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.	5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.
6. Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).	6. Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.	6. Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.
Integration of Knowledge and Ideas		
7. Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.	7. Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.	7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
8. Distinguish among fact, opinion, and reasoned judgment in a text.	8. Assess the extent to which the reasoning and evidence in a text support the author's claims.	8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.
9. Analyze the relationship between a primary and secondary source on the same topic.	9. Compare and contrast treatments of the same topic in several primary and secondary sources.	9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.
Range of Reading and Level of Text Complexity		
10. By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.	10. By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–CCR text complexity band independently and proficiently.

Reading Standards for Literacy in Science and Technical Subjects 6–12

RST

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of science and technical texts.	1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.	2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.	3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
Craft and Structure		
4. 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*.	4. 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 9–10 texts and topics*.	4. 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 11–12 texts and topics*.
5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).	5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.
Integration of Knowledge and Ideas		
7. 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).	7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Range of Reading and Level of Text Complexity		
10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.

College and Career Readiness Anchor Standards for Writing

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Text Types and Purposes*

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

Note on range and content of student writing

For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and long time frames throughout the year.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

WHST

The standards below begin at grade 6; standards for K–5 writing in history/social studies, science, and technical subjects are integrated into the K–5 Writing standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes		
1. Write arguments focused on *discipline-specific content*. a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	1. Write arguments focused on *discipline-specific content*. a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.	1. Write arguments focused on *discipline-specific content*. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

WHST

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes (continued)		
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style and objective tone. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).
3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)

Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

WHST

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Production and Distribution of Writing		
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
Research to Build and Present Knowledge		
7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
9. Draw evidence from informational texts to support analysis reflection, and research.	9. Draw evidence from informational texts to support analysis, reflection, and research.	9. Draw evidence from informational texts to support analysis, reflection, and research.
Range of Writing		
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.