SCIENCE CURRICULUM MAP

GRADE 6-8

Includes Next Generation Science Standards

Revised Summer 2019

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6-8 Next Generation Science Standards Overview

The Next Generation Science Standards are based on the Framework for K–12 Science Education developed by the National Research Council.

Advances in the Next Generation Science Standards

- Every NGSS standard has three dimensions: disciplinary core ideas (content), scientific and engineering practices, and cross-cutting concepts. Currently, most state and district standards express these dimensions as separate entities, leading to their separation in both instruction and assessment. The integration of rigorous content and application reflects how science and engineering is practiced in the real world.
- Scientific and Engineering Practices and Crosscutting Concepts are designed to be taught in context – not in a vacuum. The NGSS encourage integration with multiple core concepts throughout each year.
- Science concepts build coherently across K-12. The emphasis of the NGSS is a focused and coherent progression of knowledge from grade band to grade band, allowing for a dynamic process of building knowledge throughout a student's entire K-12 scientific education.
- The NGSS focus on a smaller set of Disciplinary Core Ideas (DCI) that students should know by the time they graduate from high school, focusing on deeper understanding and application of content.
- Science and engineering are integrated into science education by raising engineering design to the same level as scientific inquiry in science classroom instruction at all levels, and by emphasizing the core ideas of engineering design and technology applications.
- The NGSS content is focused on preparing students for college and careers. The NGSS are aligned, by grade level and cognitive demand, with the English Language Arts and Mathematics Common Core State Standards. This allows an opportunity both for science to be a part of a child's comprehensive education as well as ensuring an aligned sequence of learning in all content areas. The three sets of standards overlap and are reinforcing in meaningful and substantive ways.

Disciplinary Core Idea Progression in the NGSS

The NGSS have been developed in learning progressions based on the progressions identified by the grade-band endpoints in the Framework. Short narrative descriptions of the progressions are presented for each disciplinary core idea in each of the traditional sciences. These progressions were used in the college- and career-readiness review to determine the learning expected for each idea before leaving high school.

1. Physical Sciences (PS)
2. Life Sciences (LS)
3. Earth and Space Sciences (ESS)
4. Engineering, Technology, and Applications of Science (ETS)

Scientific and Engineering Practices in the NGSS

The Framework identifies eight science and engineering practices that mirror the practices of professional scientists and engineers. Use of the practices in the performance expectations is not only intended to strengthen students' skills in these practices but also to develop students' understanding of the nature of science and engineering. Listed below are the science and engineering practices from the Framework:

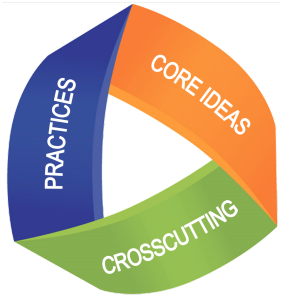
1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

Crosscutting Concepts in the NGSS

The Framework also identifies seven Crosscutting Concepts that are meant to give students an organizational structure to understand the world and help students make sense of and connect Core Ideas across disciplines and grade bands. They are not intended as additional content. Listed below are the Crosscutting Concepts from the Framework:

1. Patterns
2. Cause and Effect
3. Scale, Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter in Systems
6. Structure and Function
7. Stability and Change of Systems



DISCIPLINARY CORE IDEAS (DCI) - GRADE 6-8

District 109 Scope and Sequence

Grade	Disciplinary Core Idea (DCI)
6	ESS1.A The Universe and Its Stars
6	ESS1.B Earth and the Solar System
7	ESS1.C The History of Planet Earth
7	ESS2.A Earth Materials and Systems
7	ESS2.B Plate Tectonics and Large-Scale System Interactions
7	ESS2.C The Roles of Water in Earth's Surface Processes
8?	ESS2.D Weather and Climate
6, 7, 8	ESS3.A Natural Resources
7, 8	ESS3.B Natural Hazards

6, 7, 8	ESS3.C Human Impacts on Earth Systems
8	ESS3.D Global Climate Change
6	LS1.A Structure and Function
6, 7	LS1.B Growth and Development of Organisms
6	LS1.C Organization for Matter and Energy Flow in Organisms
6	LS1.D Information Processing
6	LS2.A Interdependent Relationships in Ecosystems
6	LS2.B Cycles of Matter and Energy Transfer in Ecosystems
6	LS2.C Ecosystem Dynamics, Functioning, and Resilience
7	LS3.A Inheritance of Traits
7	LS3.B Variation of Traits
7	LS4.A Evidence of Common Ancestry and Diversity
7	LS4.B Natural Selection
7	LS4.C Adaptation
6	LS4.D Biodiversity and Humans
8	PS1.A Structure of Matter
8	PS1.A: Structure and Properties of Matter *(HS)*
8	PS1.B: Chemical Reactions
8	PS1.B: Chemical Reactions *(HS)*
8	PS1.C Nuclear Processes *(HS)*
6	PS2.A Forces and Motion
6	PS2.B Types of Interactions
6	PS3.A Definitions of Energy
6, 7, 8	PS3.B Conservation of Energy and Energy Transfer
6	PS3.C Relationship Between Energy and Forces
6	PS3.D Energy in Chemical Processes and Everyday Life
7	PS4.A Wave Properties
7	PS4.B Electromagnetic Radiation
7	PS4.C Information Technologies and Instrumentation

SIXTH GRADE CURRICULUM MAP

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Ecosystems (10-12 weeks)	LO1**:** Develop a model to describe the cycling of matter and energy among biotic and abiotic parts of an ecosystem.	LS1.C Organization for Matter and Energy Flow in Organisms LS2.B Cycle of Matter and Energy Transfer in Ecosystems PS3.D Energy in Chemical Processes and Everyday Life	Ecosystem, Producers, Consumers, Decomposers, Biotic, Abiotic, CO_2, O_2, Nitrogen
	LO2**:** Construct an explanation showing competitive, predatory, or mutually beneficial interactions.	LS2.A Interdependent Relationships in Ecosystems	Competitive, Predatory, Mutually beneficial, Resources
	LO3**:** Give evidence to prove that humans have positively and/or negatively impacted ecosystems.	ESS3.A Natural Resources ESS3.C Human Impact *LS2.C Ecosystems, Dynamics, Functioning, and Diversity*	Habitat, Destruction, Climate change, Pollution, Deforestation, Poaching, Invasive species
	LO4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	*LS4.D Biodiversity and Humans*	

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Microlife (10-12 weeks)	LO1**:** Plan an investigation to determine the difference between abiotic particles and biotic cells.	LS1.A Structure and Function	Biotic, Abiotic, Cells, Unicellular, Multicellular, Particles
	LO2**:** Develop a model of a cell and explain how it works as a system.	LS1.A Structure and Function	Nucleus, Mitochondria, Cytoplasm, Cell Membrane, Cell Wall
	LO3**:** Use evidence to prove that groups of cells organize to make interacting systems within the body.	LS1.A Structure and Function LS1.B Growth and Development of Organisms LS1.D Information Processing	Cells, Tissues, Organs, Organ Systems

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Forces and Interactions (6-8 weeks)	LO1**:** Define a problem involving the motion of two colliding objects and design a solution.	PS2.A Forces and Motion PS2.B Types of Interactions	Balanced forces, Unbalanced force, Acceleration, Mass, Point of reference, Inertia, Momentum, Transfer of energy
	LO2**:** Explain the relationship between the different types of energy and how they are conserved.	PS3.A Definitions of Energy PS3.B Conservation of Energy and Energy Transfer PS3.C Relationship Between Energy and Forces	Energy, Speed, Mass, Height, Transfer of energy, Conservation of energy
	LO3**:** Develop a model that demonstrates repulsive or attractive interactions.	PS2.A Forces and Motion	Repulsive and attractive, Gravitational force, Electromagnetic force, Fields

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Astronomy (4-6 weeks)	LO1**:** Develop a model that illustrates the relationship between the Earth, Moon, and Sun (demonstrating things like lunar phases, seasons, eclipses, and tides).	ESS1.A The Universe and Its Stars ESS1.B Earth and the Solar System	Scale, Telescopes, Spacecraft, Satellites, Tides, Seasons, Lunar Phases, Eclipses
	LO2**:** Explain the relationship between gravity and the objects within the universe.	PS2.B Types of Interactions	Gravity, Various Objects within the Universe (planets, comets, etc.), Mass, Gravitational pull, Gravitational field, Inertia, Big Bang Theory

SEVENTH GRADE CURRICULUM MAP

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Waves & Wave Properties (5-7 weeks)	LO1: Identify different types of waves and their properties.	PS4.A Wave Properties	Identify the properties and parts of longitudinal and transverse waves. <u>Vocab</u>: wave, mechanical wave, medium, vibration, transverse wave, longitudinal wave, amplitude, wavelength, frequency, crest, trough, compressions, rarefactions, reflection, diffraction, refraction
	LO2: Develop and use a model to describe that waves are reflected,	PS4.B Electromagnetic Radiation	Demonstrate and explain how energy travels through the various types of waves.

	absorbed, or transmitted through various materials.		Vocab: radio waves, microwaves, infrared rays, visible light, ultraviolet light, x-rays, gamma rays, concave, convex
	LO3: Evaluate and explain how digitized signals transmit information.	PS4.C Information technologies and instrumentation	Develop an instrument and measure the amplitude and frequency produced by that instrument.

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Water Cycle & Human Impact (5 weeks)	LO1: Describe and identify the movement of water and states of matter as it moves through the water cycle.	ESS3.A Natural resources	The water cycle. Vocab: water cycle, evaporation, condensation, precipitation, sublimation, transpiration, percolation
	LO2: Plot current distribution of groundwater to show evidence that groundwater is a limited resource and that the demands on water have changed over time.	ESS2.C The roles of water in Earth's surface processes	Understand groundwater distribution, past and present, worldwide through plotting on a map. Vocab: transparency, pH, aquifer, hydrosphere, geosphere
	LO3: Evaluate methods of waste disposal and its effect on freshwater resources.	ESS3.C Human impacts on Earth systems	Effect of water contaminants from +waste on fresh groundwater.

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Heat Energy Transfer - Thermodynamics (3-4 weeks)	LO1: Investigate the relationships between thermal energy transfer (conduction, radiation, and convection), kinetic energy of molecules, and the specific conductive properties of materials (insulators).	PS3.B - Conservation of Energy & Energy Transfer (2nd bullet pt.)	Transfer of thermal energy from one material or area to another. Vocab: thermal energy, heat, temperature, conduction, convection, radiation, insulator, conductor, equilibrium
	LO2: Apply heat transfer principles to design and evaluate performance of a material's thermal conductivity or resistance.		Given a set of materials, test insulation and conduction properties.
	LO3: Based on knowledge of thermal conductivity or resistance of materials, design, construct, then test a structure		Design an insulated home which will not only retain heat or prevent heat from leaking in, as well as a method for conducting heat as a source.

	that resists the three types of energy transfer.		

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Genetics (6-7 weeks)	LO1: Construct a scientific explanation using relevant mathematical models and text to show how inheritance and variation of traits is based on transfer of genetic information through DNA.	LS3.A: Inheritance of Traits LS3.B: Variation of Traits	Design and complete a punnett square to solve for the probability of a specific trait will exhibit itself in the offspring. Study of the structure of the DNA molecule (ATCG), Heredity, trait, alleles, dominant & recessive, phenotypes & genotypes, heterozygous & homozygous, incomplete & codominance, sexual & asexual reproduction,
	LO2: Determine the cause and effect factors (environmental and genetic) that influence growth and behavior by conducting a scientific investigation.		Determine how genetic diseases and disorders are affected by mutations during cell reproduction.
	LO3: Construct a viable argument citing evidence from artificial selection supporting either a positive or negative impact on life.	LS4.B: Natural Selection	Focus on the positives and negatives of artificial selection and its impact on life.

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Dynamic Earth (9 weeks)	LO1: Plot current earthquake and volcano data to show evidence that supports the theory of plate tectonics resulting in the shaping of earth over time and predict future plate movement based on current plate movement.	ESS2.B Plate tectonics and large-scale system interactions	Convection current as the driving force behind plate tectonics, Continental Drift, Ocean Floor Spreading, Mid-Ocean Ridge, Subduction Zone, Plate Boundaries (Divergent, Convergent, Transform), Layers of the Earth (Inner Core, Outer Core, Mantle, Crust), Earthquakes, Volcanoes, Tsunami, Faults (strike slip, reverse, normal), Focus & Epicenter, Seismic Waves (P-Waves, S-waves, Surface Waves)
	LO2: Analyze and interpret rock strata and fossil types and formation to construct a scale of geologic time that explain major events of the history of the Earth (geological, biological, and climate).	ESS1.C The history of planet Earth LS4.A Evidence of common ancestry and diversity	Earth's story can be told through evidence found in rocks and fossils. Vocab: Precambrian Eon, Paleozoic Era, Mesozoic Era, and Cenozoic Era, mass extinction, fossil, rock cycle,

			metamorphic rock, sedimentary rock, igneous rock
	LO3: Develop a model of a structure that will withstand a seismic event within North America.	ESS2.A Earth materials and systems	

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Evolution (3-4 weeks)	LO1: Identify the cause and effect relationship of genetic variations of traits in a population that increases some individuals' probability of surviving and reproducing in a specific environment.	LS4.B Natural selection LS4.C Adaptation	Vocab: natural selection, adaptation, survival of the fittest
	LO2: Construct an explanation for the anatomical similarities and differences among modern organisms and their ancestors.	LS4.A Evidence of common ancestry and diversity	Vocab: phylogenetic tree, diversity

EIGHTH GRADE CURRICULUM MAP

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
General Scientific Skills (3 weeks)	LO1: Evaluate competing design solutions to determine if they meet the criteria and constraints of the problem.	ETS1.A: Engineering Design * Defining and Delimiting Engineering Problems: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-ETS1-1).	gram, meter, liter, density, graduated cylinder, beaker, test tube, test tube rack, Chemplate, thermometer, tongs, chemical scooper, Bunsen burner, flint lighter, watch glass, Petri dish, stirring rod, balance, Erlenmeyer flask, funnel, bottle, rubber stopper, wire gauze, pipette, evaporating dish, rubber tubing, test tube brush, ring stand, test tube holder, mortar & pestle, medicine dropper, hot plate, safety goggles, cork stopper
	LO2: Analyze data to compare designs and identify the best characteristics of each in order to create an optimal solution, design or prototype. (Science and Engineering Practices)	ETS1.B: Engineering Design * Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution	

		to better meet the criteria for success. (MS-ETS1-3).	
	LO3: Develop a model to generate data for testing and modification of a proposed object, tool, or process to create an optimal design. (Science and Engineering Practices) (Knowledge of Science Concepts)	ETS1.B: Engineering Design * Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.(MS-ETS1-4).	
Safety & Equipment	LO1: Follow precisely multi step procedures while carrying out an experiment, taking appropriate safety precautions, careful measurements, and completing technical tasks.		
	LO2: Analyze and interpret data from varying investigation types.		

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Structure & Properties of Matter **(4 weeks)**	LO1**:** Plan and carry out an investigation to facilitate a change in state of matter. (Science and Engineering Practices) (Knowledge of Science Concepts)	PS1.A Structures and Properties of Matter * The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.	Matter, Solid, Liquid, Gas, Change in state (condensation, evaporation, melting, freezing), Temperature
	LO2: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when a component of a system, such as thermal energy, is changed. (Science and Engineering Practices) (Knowledge of Science Concepts)	PS1.A Structures and Properties of Matter * The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.	Matter, Solid, Liquid, Gas, Phase Change, Solute, Solvent, Solution, Dilute, Concentrate, Freezing, Melting, Boiling, Condensation, Sublimation, Deposition, Chromatography, Homogeneous Mixture, Heterogeneous Mixture
	LO3: Construct an explanation comparing the states of matter, phase changes, particle motion and how temperature and/or pressure affect the states of matter. (Knowledge of Science Concepts)(Scientific Reading and Writing)	PS1.A: Structure and Properties of Matter * 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-PS1-4)	**Activities that focus on the DCI:** lab- Yes it Does Matter, lab - Exploring Matter
	LO4: Identify and analyze the physical properties of pure substances and		

	mixtures. (Knowledge of Science Concepts)		

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Structure & Properties of Matter (Atom Unit) (2 weeks)	LO1: Develop models to describe the atomic composition of simple molecules and extended structures. (Science and Engineering Practices) (Knowledge of Science Concepts)	PS1.A: Structure and Properties of Matter *Develop models to describe the atomic composition of simple molecules and extended structures. (include how protons, neutrons and electrons make up the atom, do not go into molecules) (MS-PS1-1)	Atom, Nucleus, Proton, Neutron, Electron, Observation, Direct/Indirect Inference, Democritus, Dalton, Thomson, Rutherford, Bohr, Shroedinger, Chadwick, Nakahara **Activities that focus on the DCI:** Mystery Box activity, Models of Atoms using everyday items.
	LO2: Analyze and interpret data on the properties of substances.	PS1.A: Structure and Properties of Matter * Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)	**Activities that focus on the DCI:**
		PS1.A.: Structure and Properties of Matter * Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1)	**Activities that focus on the DCI:**

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Structure & Properties of Matter (Periodic Table of Elements Unit) (2 weeks)	*LO1: Communicate information demonstrating the properties of an element on the periodic table.*	*PS1.A Structures and Properties of Matter*	*Protons, Neutrons, Electrons, Atoms, Atomic number, Atomic mass*
	LO2: 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. (Science and Engineering Practices)	PS1.A: Structure and Properties of Matter * The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns	PTE, Chemical Symbol, Chemical Name, Period/Group, Metal, Metalloid, Non Metal, Malleable, Ductile, Conductivity, Reactivity, Alkali Metals, Ions, Isotopes

		of outer electron states. (HS-PS1-1),(HS-PS1-2)	
	LO3: 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. (Knowledge of Science Concepts)	PS1.A: Structure and Properties of Matter * A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (HS-PS1-4)	
		PS1.A. Structure and Properties of Matter * Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1)	

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Chemical Reactions (Compounds and Molecules Unit) (3 weeks)	LO1: Analyze and interpret data on the properties of substances.	PS1.A: Structure and Properties of Matter * Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)	valence electrons, chemical bond, atomic number, molecule, formula weight, polyatomic ion, ionic compound, subscript, octet rule, cation, anion, percent ionic character, double bond, molecular bond, covalent bond, polar compound, triple bond, electronegativity, chemical formula, ionic bond, ion, mixture, compound, element, nonpolar compound, dipole compound
	LO2: 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.(Knowledge of Science Concepts)	PS1. B. Chemical Reactions * Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2 and MS-PS1-3)	
		PS1.B. Chemical Reactions * The total number of each type of atom is	

		conserved, and thus the mass does not change. (MS-PS1-5)	
		PS1. B. Chemical Reactions * Some chemical reactions release energy, others store energy. (MS-PS1-6)	

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Chemical Reactions (Chemical Interactions) (7 weeks)	LO1: Construct an explanation explaining decomposition, replacement, and synthesis chemical reactions.	PS1.B: Chemical Reactions * Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2),(MS-PS1-3),(MS-PS1-5)	Acids, Bases, pH, Catalyst, Displacement, Synthesis, Decomposition, Combustion, Replacement, Bonding Energy, Endothermic, Exothermic, Activation Energy, Precipitant, Effervescence
	LO2: Use evidence to support a claim that a chemical reaction/change has occurred. (Scientific Reading and Writing)	PS1.B. Chemical Reactions * The total number of each type of atom is conserved, and thus the mass does not change. (MS-PS1-5) * Some chemical reactions release energy, others store energy. (MS-PS1-6)	
	LO3: Develop a closed chemical experiment and test. (Science and Engineering)	PS1.B: Chemical Reactions * Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (HS-PS1-4),(HS-PS1-5)	
	LO4: 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. (Knowledge of Science Concepts)	PS1.B: Chemical Reactions * The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1-7)	

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Environmental Studies & Human Impact (5 weeks)	LO1: Analyze factors that affect weather and climate then create models that account for regional differences. (Knowledge of Science Concepts) (Connections Between Sciences)	ESS2. Weather & Climate * Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. (MS-ESS2-5).	Conduction, Convection, Radiation, Troposphere, Stratosphere, Mesosphere, Thermosphere, Ozone Layer, Exosphere, Anemometer, Wind Vane, Barometer, Thermometer, Psychrometer, Air Mass, Front, Hurricane, Tornado, Lightning
	LO2: Analyze and interpret historical and current data about the occurrence of local, regional, and global natural hazards and the impact of human activities on Earth's system.	ESS2. Weather & Climate * Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. (MS-ESS2-5).	
		ESS2. Weather & Climate * 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. (MS - ESS2-6).	
		ESS2. Weather & Climate * Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (MS-ESS3-5). Global Climate Change: (HS-ESS3.D).	
		ESS2.D. Weather & Climate * Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)	
		ESS2.D. Weather & Climate * Because these patterns are so complex, weather can only be	

		predicted probabilistically. (MS-ESS2-5)	
		ESS2.D. Weather & Climate * The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)	
		ESS3.D. Global Climate Change * Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5)	
		ESS3. Human Impacts * Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2)	
		ESS3.C: Human Impacts* Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. (MS-ESS3-4)	
		ESS3.B Natural Hazards * Mapping the history of natural hazards in a region,	

		combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (HS-ESS3-1)	

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Environmental Studies & Human Impact (Energy) (5 weeks)	LO1: Construct an energy plan using renewable and nonrenewable energy resources. (Scientific Reading and Writing)	PS3: Energy * 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-PS3-4).	Calorie, Solar, Geothermal, Wind, Hydroelectric, Biomass,Fossil Fuel, Nuclear, Renewable, Nonrenewable
	LO2: Construct and design solutions to promote sustainability of natural resources.	ETS: Engineering Design * Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-ETS1-1).	
	LO3: Distinguish between natural processes and human activities that are causal or correlational in altering global climate and the greenhouse effect.	PS1.A: Structure and Properties of Matter *Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. (MS-PS1-3)	

UNIT NAME AND PACING	LEARNING OUTCOMES	DISCIPLINARY CORE IDEAS	VOCAB/CONCEPTS
Mining (3 weeks)	LO1: Separate heterogeneous mixtures using various physical and chemical processes into the original substances that composed the mixture.	ETS1.A: Engineering Design * Defining and Delimiting Engineering Problems: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and	Mineral, Open-pit, Mine, Electrolysis, Metal Displacement, Vein

		the natural environment that may limit possible solutions. (MS-ETS1-1).	