

Science Scope and Sequence

The AAC Science Curriculum presents students with hands-on experiences and concepts which help them to understand the world around them. The basis is from the Next Generation Science Standards (NGSS) from K-12 and the California Preschool Learning Foundations (KG1 & PK). The science coursework is combined with other subject areas, whenever possible, to demonstrate to students that science is a part of everything. In high school, students will have choices in grades 11 and 12, depending on whether they take IB or not.

12th Grade AP Psychology				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Units	<ul style="list-style-type: none"> - 1. Scientific Foundation of Psychology - 2. Biological bases of behavior - 3. Sensation and Perception 	<ul style="list-style-type: none"> - 4. Learning - 5. Cognitive Psychology - 6. Developmental Psychology 	<ul style="list-style-type: none"> - 7. Motivation, Emotion, and Personality - 8. Clinical Psychology 	<ul style="list-style-type: none"> - 9. Social Psychology
Learning Targets	<ul style="list-style-type: none"> - 1. Identify the research contributions of major historical figures in psychology. • Describe and compare different theoretical approaches in explaining behavior. • Distinguish the different domains of psychology. • Differentiate types of research with regard to purpose, strengths, and weaknesses. - 2. Identify key research contributions of scientists in the area of heredity and environment. • Predict how traits and behavior can be selected for their adaptive value. • Discuss the effect of the endocrine system on behavior. • Describe the nervous system and its 	<ul style="list-style-type: none"> - 4. • Describe the essential characteristics of insight learning, latent learning, and social learning. • Apply learning principles to explain emotional learning, taste aversion, superstitious behavior, and learning helplessness. • Describe basic classical conditioning phenomena. • Predict the effects of operant conditioning and how the practice, schedules of reinforcement, and motivation will influence quality of learning - 5. Compare and contrast various cognitive processes. • Describe 	<ul style="list-style-type: none"> - 7. • Identify and apply basic motivational concepts to understand the behavior of humans and other animals. • Compare and contrast motivational theories, including the strengths and weakness of each. • Describe classic research findings in specific motivations, as well as the biological underpinnings of motivation. • Compare and contrast major theories of emotion. - 8. • Recognize the use of the most recent version of the Diagnostic and Statistical Manual of Mental Disorders (DSM) published by the American Psychiatric 	<ul style="list-style-type: none"> - 9. • Apply attribution theory to explain motives. • Articulate the impact of social and cultural categories on self-concept and relations with others. • Anticipate the impact of self-fulfilling prophecy on behavior. • Discuss attitude formation and change, including persuasion strategies and cognitive dissonance

	<p>subdivisions and functions.</p> <ul style="list-style-type: none"> • Identify basic processes and systems in the biological bases of behavior, including parts of the neuron. <p>-</p> <p>- 3. Describe general principles of organizing and integrating sensation to promote stable awareness of the external world.</p> <ul style="list-style-type: none"> • Discuss basic principles of sensory transduction, including absolute threshold, difference threshold, signal detection, and sensory adaptation. • Identify the research contributions of major historical figures in sensation and perception. • Discuss how experience and culture can influence perceptual processes. 	<p>and differentiate psychological and physiological systems of memory.</p> <ul style="list-style-type: none"> • Identify the contributions of key researchers in cognitive psychology. • Outline the principles that underlie construction and encoding of memories, effective storage of memory, and strategies for retrieving memory, memory improvement, and typical memory errors <p>- 6. Explain the process of conception and gestation, including factors that influence successful prenatal development.</p> <ul style="list-style-type: none"> • Discuss the interaction of nature and nurture, specifically on physical, social, cognitive, and moral development. • Discuss maturation of motor skills. • Explain how parenting styles influence development 	<p>Association as the primary reference for making diagnostic judgements.</p> <ul style="list-style-type: none"> • Describe contemporary and historical conceptions of what constitutes psychological disorders. • Discuss the intersection between psychology and the legal system. • Evaluate the strengths and limitations of various approaches to explaining psychological disorders. 	
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	12th Grade Environmental and Space Science			
Title	Earth's Place in the Universe	Earth's Systems	Earth's Life Systems	Earth and Human Activity
Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4

<p>Skills</p>	<ul style="list-style-type: none"> - SI units - Scientific notation - Using Flow charts - Using evidence from outside sources to support a statement (research paper) 	<ul style="list-style-type: none"> - Make inferences based on information in case studies (examples: images of Earth structures) - Using facts to support your conclusions - Using and citing reliable sources 	<ul style="list-style-type: none"> - Read and interpret pie charts, bar graphs and line graphs - Use data from images and graphs to support a conclusion - Make inferences about the data you would find to support different scenarios (example: what data would you find if there was an ancient lake on Earth?) 	<ul style="list-style-type: none"> - Read and interpret pie charts, bar graphs and line graphs - Use data from images and graphs to support a conclusion - Use evidence from several sources to construct an argument - Defend an argument using data
<p>Standards</p>	<p>HS-ESS1-1. 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.</p> <p>HS-ESS1-2. 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.</p> <p>HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.</p> <p>HS-ESS1-4. Use mathematical or computational representations to predict the motion of orbiting objects in the</p>	<p>HS-ESS1-5. 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.</p> <p>HS-ESS1-6. 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.</p> <p>HS-ESS2-1. 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.</p> <p>HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth's systems.</p>	<p>HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.</p> <p>HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.</p> <p>HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.</p> <p>HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth</p>	<p>HS-ESS3-1. 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.</p> <p>HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*</p> <p>HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.</p> <p>HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*</p> <p>HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the</p>

	solar system.	HS-ESS2-3. Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.		current rate of global or regional climate change and associated future impacts to Earth systems.
11th Grade Physics				
Title	HS.Forces and Motions Interactions	HS.Energy	Electricity and Magnetism	HS.Waves and Electromagnetic Radiation
Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Skills	<ul style="list-style-type: none"> • Draw FBD • Graph one and two dimensional motion Motion • Verify The Newton laws • Define the effect of momentum and impulse • Verify momentum conservation 	<ul style="list-style-type: none"> • Describe and explain the exchange between potential energy and internal energy • Determine the energy stored in a spring • Observe and explain energy conversions in real world • Compare the power developed when different work is done at different rates • Verify the gas laws <ul style="list-style-type: none"> • Define thermal equilibrium, thermal expansion and temperature 	<ul style="list-style-type: none"> • Draw and interpret electric field with relation to magnetic fields • Verify Newton laws, and coulomb's law in the application of electrostatic forces between objects <ul style="list-style-type: none"> • Measure current and voltage in a circuit • Explain electric induction • Calculate power in terms of energy and time • Interpret graphs of voltage against current • Determine the universal gravitational force on the planetary circular motion 	<ul style="list-style-type: none"> • Interpret waveforms with various characteristics • Identify nodes and antinodes in standing waves • Distinguish between longitudinal and transverse waves • Predict the behavior of particles waves • Determine the speed of sound in air • Sketch and interpret the wavelength, time, frequency, and the wave speeds in the displacement time graph <ul style="list-style-type: none"> • Investigate digital transmission processes and its impact on storing information • Explain radiation and decaying processes of objects through time
Standards	HS-PS2-1. Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a	HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in	HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic	HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

	<p>macroscopic object, its mass, and its acceleration.</p> <p>HS-PS2-2. 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.</p> <p>HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*</p>	<p>energy of the other component(s) and energy flows in and out of the system are known.</p> <p>HS-PS3-2. 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).</p> <p>HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*</p> <p>HS-PS3-4. 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).</p>	<p>forces between objects.</p> <p>HS-PS2-5. Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.</p> <p>HS-PS3-5. 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.</p>	<p>HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information.</p> <p>HS-PS4-3. 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.</p> <p>HS-PS4-4. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.</p> <p>HS-PS4-5. 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.*</p>
	10th Grade Chemistry			
Title	Biochemistry Ecosystems and Heredity	Chemistry 2 Conservation of energy and equilibrium		

Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Skills	<ul style="list-style-type: none"> ● Explore the flow energy within the living and non living organisms ● Investigate the symbiotic effect between organisms and their ecosystems ● Explain the impact of human action on the environment ● Identify and explain the effect of biotic and Abiotic factors on the ecosystems 	<ul style="list-style-type: none"> ● Describe the macromolecules of life ● Explain the role of deoxyribonucleic acids and ribonucleic acids in inheritance ● Investigate cellular division of sex cells, and somatic cells ● Draw and explain the parts of chromosomes and alleles ● Identify the limitations and evolution theories, and speciation ● Construct mendelian genetic models to determine recessive and dominant genes 	<ul style="list-style-type: none"> ● Define Nuclear forces ● Explain the intermolecular forces in the nucleus of the atom by the process of fission and fusion and give examples ● Predict the products of chemical reactions based on their properties ● Describe synthesis, decomposition, single replacement, and double replacement chemical reactions ● Balance, and name ionic, and covalent bonding compounds ● Describe the reaction between metal and nonmetal elements. ● Establish the relationship between factors affecting the rates of reaction such as catalysts, and other factors 	<ul style="list-style-type: none"> ● State the law of conservation mass ● Balance chemical equations ● Calculate the molar mass using avogadro's law ● Determine the excess, and limiting reagents in a chemical reaction ● State the law of chemical equilibria
Standards	<ul style="list-style-type: none"> - Transfer of energy through ecosystems - Biodiversity - Impact of changing conditions on an ecosystem and biodiversity - Carrying capacity - Impact of human activity on biodiversity 	<ul style="list-style-type: none"> - Inheritance of dominant and recessive traits - Role of DNA in inheritance of traits - Mitosis vs meiosis - Causes of genetic variation - Benefits of genetic variation - Causes of changes in allele Frequency in populations 	<ul style="list-style-type: none"> - Fission, fusion and radioactive decay - conservation in energy system during a chemical reaction - Writing chemical formulae - Naming chemical formulae - Writing balanced reactions - factors affecting rates of reactions 	<ul style="list-style-type: none"> - Conservation of mass in a chemical reaction - Mole number and conversions - Stoichiometry - Dynamic and Static equilibria - factors affecting dynamic equilibria

		<ul style="list-style-type: none"> - Factors driving evolution and speciation - Factors leading to species extinction 		
	9th Grade Biology			
Title	HS.Structure and Function	HS.Matter and Energy in Organisms and Ecosystems	HS.Interdependent Relationships in Ecosystems	HS.Inheritance and Variation of Traits
Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Skills	<ul style="list-style-type: none"> - Draw a scale diagram - Use standard international units and convert between them (Tera all the way down to pico) - Measure length - Use scientific notation - Use a microscope - Draw labeled diagrams of observations - Calculate magnification - Calculate uncertainty in a measurement 	<ul style="list-style-type: none"> -Use flow charts to describe processes -Create a model to describe processes -Interpret and draw data tables -Interpret and draw bar charts -Use evidence from bar charts to support an argument -Use evidence from articles to support an argument 	<ul style="list-style-type: none"> - Interpret and draw line graphs - Use evidence from line to support an argument - Use evidence from articles to support an argument 	<ul style="list-style-type: none"> - Determine probability of a scenario occurring using tables - Convert between percentage and fractions - Use evidence from case studies to defend an argument

<p>Standards</p>	<p>HS-LS1-1. 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.</p> <p>HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</p> <p>HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>	<p>HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.</p> <p>HS-LS1-6. 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.</p> <p>HS-LS1-7. 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.</p> <p>HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.</p> <p>HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.</p> <p>HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular</p>	<p>HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.</p> <p>HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.</p> <p>HS-LS2-6. 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.</p> <p>HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*</p> <p>HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.</p> <p>HS-LS4-6. Create or revise a simulation to test a solution to</p>	<p>HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.</p> <p>HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.</p> <p>HS-LS3-2. 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.</p> <p>HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.</p>
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		respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	mitigate adverse impacts of human activity on biodiversity.*	
Title	8th Grade: Physical Science			
Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Skills				
Standards	<p>Matter</p> <ul style="list-style-type: none"> - Develop models to describe the atomic composition of simple molecules and extended structures. - Atomic particles & structure - Bonds - Periodic Table - Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. 	<p>Chemical Reactions</p> <ul style="list-style-type: none"> - Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. - 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. - 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. 	<p>Forces, Motion, and Energy</p> <ul style="list-style-type: none"> - Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. - 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. - Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. - Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. - Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting 	<p>Waves</p> <ul style="list-style-type: none"> - 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. - Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. - 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.

			<p>forces on each other even though the objects are not in contact.</p> <ul style="list-style-type: none"> - 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. - 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. - Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. - 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. - 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. 	
Title	7th Grade: Earth Science			
Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Skills				

Standards	<p>Geosphere</p> <ul style="list-style-type: none"> -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. -Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. -Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. -Volcanoes and earthquakes: analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. 	<p>Hydrosphere and atmosphere</p> <ul style="list-style-type: none"> -Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. -Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. -Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. -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. -Forecasting Weather 	<p>Biosphere</p> <ul style="list-style-type: none"> -Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. -Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. -Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. -Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. -Evaluate competing design solutions for maintaining biodiversity and ecosystem services. 	<p>Astronomy</p> <ul style="list-style-type: none"> -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. -Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. -Analyze and interpret data to determine scale properties of objects in the solar system.
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6th Grade: Life Science & Health

Title	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Quarter				
Skills				
Standards	Multicellular organisms	Cells	Genetics - Asexual vs Sexual reproduction	Evolution - What is a species

	<ul style="list-style-type: none"> - Organization of multicellular organisms (cells, tissues, organs, organ systems) - Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. - Overview of organ systems including respiratory, circulatory, digestive, reproductive, nervous, musculoskeletal and lymphatic. - 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. - Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. 	<ul style="list-style-type: none"> - Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells - Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. - 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. -1.1 Cell Theory & Organelles 1.2 -Basic Cellular Processes,Respiration/Energy Plant vs. Animal Cells -Structure 1.6-Photosynthesis 	<ul style="list-style-type: none"> - 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. - Introduction to mitosis and meiosis - Introduction to mendelian genetics (limited to dominant and recessive traits) - Causes of genetic variation in a population - Causes of changes in allele frequencies (simple examples of trait frequency such as more blond haired people in northern regions) <p>Sex Education</p>	<ul style="list-style-type: none"> - Causes of speciation - Causes of extinction - Ways to save endangered species
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Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Quarter 1

Quarter 2

Quarter 3

Quarter 4

Structure and Properties of Matter

Develop a model to describe that matter is made of particles too small to be seen.

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.

Make observations and measurements to identify materials based on their properties.

Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Matter and Energy in Organisms and Ecosystems

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.

Support an argument that plants get the materials they need for growth chiefly from air and water.

Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Earth's Systems

Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment

Space Systems: Stars and the Solar System

Support an argument that the gravitational force exerted by Earth on objects is directed down.

Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

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.

4th Grade Science

Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or

	<p>cost.</p> <p>Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p>			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
	<p style="text-align: center;">Changes on Earth’s Surface</p> <p>Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.</p> <p>Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation</p> <p>Analyze and interpret data from maps to describe patterns of Earth’s features.</p> <p>Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.</p>	<p style="text-align: center;">Energy, Motion, and Collisions</p> <p>Use evidence to construct an explanation relating the speed of an object to the energy of that object.</p> <p>Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</p> <p>Ask questions and predict outcomes about the changes in energy that occur when objects collide. (Collision is energy being transferred.)</p> <p>Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. (Used with collisions)</p>	<p style="text-align: center;">Transfer of Energy and Information</p> <p>Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. (Used with sound and light.)</p> <p>Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.</p> <p>Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.</p> <p>Generate and compare multiple solutions that use patterns to transfer information.</p> <p>Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p>	<p style="text-align: center;">The Structure and Functions of Organisms</p> <p>Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p>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</p>

3rd Grade Science

Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Quarter 1

Quarter 2

Quarter 3

Quarter 4

Inheritance and Variation of Traits: Life Cycles and Traits

Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

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.

Use evidence to support the explanation that traits can be influenced by the environment

Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding

Interdependent Relationships in Ecosystems

Construct an argument that some animals form groups that help members survive.

Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

Weather and Climate

Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

Obtain and combine information to describe climates in different regions of the world.

Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

Forces and Interactions

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

Define a simple design problem that can be solved by applying scientific ideas about magnets.

	mates, and reproducing.			
2nd Grade Science				
<u>Engineering Design</u> K-2-ETS1				
Ask questions, make observations, gather information about a situation people want to change to define a simple problem that can be solved through the development of a new improved object or tool.				
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.				
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
	<p>Structure and Properties of Matter</p> <p>Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</p> <p>Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.</p> <p>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.</p> <p>Construct an argument with evidence that some changes</p>	<p>Interdependent Relationships in Ecosystems</p> <p>Plan and conduct an investigation to determine if plants need sunlight and water to grow.</p> <p>Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.</p> <p>Make observations of plants and animals to compare the diversity of life in different habitats.</p>	<p>Earth's Systems: Processes that Shape the Earth</p> <p>Use information from several sources to provide evidence that Earth events can occur quickly or slowly.</p> <p>Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.</p>	<p>Earth's Systems: Processes that Shape the Earth</p> <p>Develop a model to represent the shapes and kinds of land and bodies of water in an area.</p> <p>Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p>

	caused by heating or cooling can be reversed and some cannot.			
1st Grade Science				
<p style="text-align: center;"><u>Engineering Design</u> K-2-ETS1</p> <p>Ask questions, make observations, gather information about a situation people want to change to define a simple problem that can be solved through the development of a new improved object or tool.</p> <p>Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p>				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
	<p style="text-align: center;">Waves: Light and Sound</p> <p>Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.</p> <p>Make observations to construct an evidence-based account that objects can be seen only when illuminated.</p> <p>Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.</p> <p>Use tools and materials to design and build a device that uses light or sound to solve the</p>	<p style="text-align: center;">Structure, Function, and Information Processing *Focus on Plants</p> <p>Use materials to design a solution to a human problem by mimicking how plants use their external parts to help them survive, grow, and meet their needs.</p> <p>Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.</p> <p>Make observations to construct an evidence-based account that young plants are like, but not exactly like, their parents.</p>	<p style="text-align: center;">Structure, Function, and Information Processing *Focus on Animals</p> <p>Use materials to design a solution to a human problem by mimicking how animals use their external parts to help them survive, grow, and meet their needs.</p> <p>Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.</p> <p>Make observations to construct an evidence-based account that young animals are like, but not exactly like, their parents.</p>	<p style="text-align: center;">Space Systems: Patterns and Cycles</p> <p>Use observations of the sun, moon, and stars to describe patterns that can be predicted.</p> <p>Make observations at different times of year to relate the amount of daylight to the time of year.</p>

	problem of communicating over a distance.			
Kindergarten (KG2) Science				
Engineering Design K-2-ETS1				
Ask questions, make observations, gather information about a situation people want to change to define a simple problem that can be solved through the development of a new improved object or tool.				
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.				
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
	<p style="text-align: center;">Weather and Climate</p> <p>Make observations to determine the effect of sunlight on Earth's surface.</p> <p>Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.</p> <p>Use and share observations of local weather conditions to describe patterns over time.</p> <p>Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.</p>	<p style="text-align: center;">Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment</p> <p>*Focus on Habitats and animal/plant relationships in those habitats</p> <p>Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</p>	<p style="text-align: center;">Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment</p> <p>*Focus on adaptation of animals/plants in their environment.</p> <p>*Focus on human impact on habitats</p> <p>Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</p> <p>Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.</p>	<p style="text-align: center;">Forces and Interactions: Pushes and Pulls</p> <p>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.</p> <p>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.</p>
Kindergarten (KG1) Science				

Engineering Design K-2-ETS1

Ask questions, make observations, gather information about a situation people want to change to define a simple problem that can be solved through the development of a new improved object or tool.

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
	<p><u>Life Science</u></p> <p>1.4 Indicate knowledge of the difference between animate and inanimate objects, providing greater detail, and recognize that living things (humans, animals, and plants) undergo biological processes such as growth, illness, healing, and dying.</p> <p>1.2 Indicate greater knowledge of body parts and processes (e.g., eating, sleeping, breathing, walking) in humans and other animals.</p> <p>2.2 Develop a greater understanding of the basic needs of humans, animals, and plants (e.g., food, water, sunshine, shelter).</p> <p><u>Scientific Inquiry</u></p> <p>1.1 Demonstrate curiosity and an increased ability raise</p>	<p><u>Life Science</u></p> <p>1.3 Recognize that living things have habitats in different environments suited to their unique needs.</p> <p>1.1 Identify characteristics of a greater variety of animals and plants and demonstrate an increased ability to categorize them.</p> <p>2.1 Observe and explore growth in humans, animals, and plants and demonstrate an increased understanding that living things change as they grow and go through transformations related to the life cycle (for example, from a caterpillar to butterfly).</p> <p><u>Scientific Inquiry</u></p> <p>1.1 Demonstrate curiosity and an increased ability raise questions about objects and</p>	<p><u>Earth Science</u></p> <p>1.1 Demonstrate increased ability to investigate and compare characteristics (size, weight, shape, color, texture) of earth materials such as sand, rocks, soil, water, and air.</p> <p>2.1 Demonstrate an increased ability to observe and describe natural objects in the sky and to notice patterns of movement and apparent changes in the sun and the moon.</p> <p>2.2 Demonstrate an increased ability to observe, describe, and discuss changes in weather.</p> <p>2.3 Demonstrate an increased ability to notice and describe the effects of weather and seasonal changes on their own lives and on plants and animals.</p> <p>2.4 Demonstrate an increased awareness and the ability to</p>	<p><u>Physical Science</u></p> <p>1.1 Demonstrate increased ability to observe, investigate, and describe in greater detail the characteristics and physical properties of objects and of solid and nonsolid materials (size, weight, shape, color, texture, and sound).</p> <p>2.1 Demonstrate an increased awareness that objects and materials can change in various ways. Explore and describe in greater detail changes in objects and materials (rearrangement of parts; change in color, shape, texture, form, and temperature).</p> <p>2.2 Demonstrate an increased ability to observe and describe in greater detail the motion of objects (in terms of speed, direction, the ways things move), and to explore the effect of own actions on the motion of objects, including changes in speed and direction.</p>

	<p>questions about objects and events in their environment.</p> <p>1.2 Observe objects and events in the environment and describe them in greater detail.</p> <p>1.4 Compare and contrast objects and events and begin to describe similarities and differences in greater details.</p> <p>1.5 Demonstrate an increased ability to make predictions and check them (eg, may make more complex predictions, offer ways to test predictions, and discuss why predictions were correct or incorrect.)</p> <p>1.6 Demonstrate an increased ability to make inferences and form generalizations based on evidence.</p>	<p>events in their environment.</p> <p>1.2 Observe objects and events in the environment and describe them in greater detail.</p> <p>1.4 Compare and contrast objects and events and begin to describe similarities and differences in greater details.</p> <p>1.5 Demonstrate an increased ability to make predictions and check them (eg, may make more complex predictions, offer ways to test predictions, and discuss why predictions were correct or incorrect.)</p> <p>1.6 Demonstrate an increased ability to make inferences and form generalizations based on evidence.</p>	<p>discuss in simple terms how to care for the environment, and participate in activities related to its care.</p> <p>Scientific Inquiry</p> <p>1.1 Demonstrate curiosity and an increased ability raise questions about objects and events in their environment.</p> <p>1.2 Observe objects and events in the environment and describe them in greater detail.</p> <p>1.4 Compare and contrast objects and events and begin to describe similarities and differences in greater details.</p> <p>1.5 Demonstrate an increased ability to make predictions and check them (eg, may make more complex predictions, offer ways to test predictions, and discuss why predictions were correct or incorrect.)</p> <p>1.6 Demonstrate an increased ability to make inferences and form generalizations based on evidence.</p>	<p>Scientific Inquiry</p> <p>1.1 Demonstrate curiosity and an increased ability raise questions about objects and events in their environment.</p> <p>1.3 Identify and use a greater variety of observation and measurement tools. May spontaneously use an appropriate tool, though may still need adult support.</p> <p>1.4 Compare and contrast objects and events and begin to describe similarities and differences in greater details.</p> <p>1.5 Demonstrate an increased ability to make predictions and check them (eg, may make more complex predictions, offer ways to test predictions, and discuss why predictions were correct or incorrect.)</p> <p>1.6 Demonstrate an increased ability to make inferences and form generalizations based on evidence.</p>
	Pre-Kindergarten Science			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4

	<p><u>Life Science</u></p> <p>1.4 Indicate knowledge of the difference between animate objects (animals, people) and inanimate objects. For example, expect animate objects to initiate movement and to have different insides than inanimate objects.</p> <p>1.2 Begin to indicate knowledge of body parts and processes (e.g., eating, sleeping, breathing, walking) in humans and other animals.</p> <p>2.2 Recognize that animals and plants require care and begin to associate feeding and watering with the growth of humans, animals, and plants.</p> <p><u>Scientific Inquiry</u></p> <p>1.1 Demonstrate curiosity and raise simple questions about objects and events in their environment.</p> <p>1.2 Observe objects and events in the environment and describe them.</p> <p>1.4 Compare and contrast objects and events and begin to describe similarities and</p>	<p><u>Life Science</u></p> <p>1.3 Identify the habitats of people and familiar animals and plants in the environment and begin to realize that living things have habitats in different environments.</p> <p>1.1 Identify characteristics of a variety of animals and plants, including appearance (inside and outside) and behavior, and begin to categorize them</p> <p>2.1 Observe and explore growth and changes in humans, animals, and plants and demonstrate an understanding that living things change over time in size and in other capacities as they grow.</p> <p><u>Scientific Inquiry</u></p> <p>1.1 Demonstrate curiosity and raise simple questions about objects and events in their environment.</p> <p>1.2 Observe objects and events in the environment and describe them.</p> <p>1.4 Compare and contrast objects and events and begin to describe similarities and</p>	<p><u>Earth Science</u></p> <p>1.1 Investigate characteristics (size, weight, shape, color, texture) of earth materials such as sand, rocks, soil, water, and air.</p> <p>2.1 Observe and describe natural objects in the sky (sun, moon, stars, clouds) and how they appear to move and change.</p> <p>2.2 Notice and describe changes in weather.</p> <p>2.3 Begin to notice the effects of weather and seasonal changes on their own lives and on plants and animals.</p> <p>2.4 Develop awareness of the importance of caring for and respecting the environment, and participate in activities related to its care.</p> <p><u>Scientific Inquiry</u></p> <p>1.1 Demonstrate curiosity and raise simple questions about objects and events in their environment.</p> <p>1.3 Begin to identify and use, with adult support, some observation and measurement tools.</p> <p>1.4 Compare and contrast objects and events and begin to describe</p>	<p><u>Physical Science</u></p> <p>1.1 Observe, investigate, and identify the characteristics and physical properties of objects and of solid and nonsolid materials (size, weight, shape, color, texture, and sound).</p> <p>2.1 Demonstrate awareness that objects and materials can change; explore and describe changes in objects and materials (rearrangement of parts; change in color, shape, texture, temperature).</p> <p>2.2 Observe and describe the motion of objects (in terms of speed, direction, the ways things move), and explore the effect of own actions (e.g., pushing, pulling, rolling, dropping) on making objects move.</p> <p><u>Scientific Inquiry</u></p> <p>1.1 Demonstrate curiosity and raise simple questions about objects and events in their environment.</p> <p>1.2 Observe objects and events in the environment and describe them.</p> <p>1.4 Compare and contrast objects and events and begin to describe similarities and differences.</p> <p>1.5 Make predictions and check them, with adult support, through</p>
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	differences.	differences. 1.5 Make predictions and check them, with adult support, through concrete experiences. 1.6 Make inferences and form generalizations based on evidence.	similarities and differences. 1.5 Make predictions and check them, with adult support, through concrete experiences. 1.6 Make inferences and form generalizations based on evidence.	concrete experiences. 1.6 Make inferences and form generalizations based on evidence.
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