Proven Science Programs

Gizmos Alignment to *Issues and Science*, developed by SEPUP

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Note, Gizmos are available separately at https://www.explorelearning.com, this list is not an implied endorsement of the content, just supplied by the Lab-Aids Product Management Team as a service for teachers who use Gizmos. This list is arranged by NGSS PE.

MS-PS1: Matter and Its Interactions

MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures.

Covalent Bonds	Chemistry of Materials
Dehydration Synthesis (glucose)	

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.

Chemical Changes	Chemical Reactions

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.

Melting Points	Chemistry of Materials
Phase Changes	Chemistry of Materials
Phases of Water	Chemistry of Materials
Temperature and Particle Motion	Chemistry of Materials

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.

Balancing Chemical Equations	Chemical Reactions
Chemical Changes	Chemical Reactions
Chemical Equations	Chemical Reactions

MS-PS1-6: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Feel the Heat	Chemical Reactions

MS-PS2: Motion and Stability: Forces and Interactions

MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.

Crumple Zones	Force & Motion

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.

Crumple Zones	Force & Motion
Fan Cart Physics	Force & Motion
Force and Fan Carts	Force & Motion
Free-Fall Laboratory	Fields & Interactions, Force & Motion

MS-PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

Charge Launcher	Fields & Interactions
Electromagnetic Induction	Fields & Interactions
Magnetic Induction	Fields & Interactions
Pith Ball Lab	Fields & Interactions

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.

Gravitational Force	Fields & Interactions
Gravity Pitch	Fields & Interactions
Weight and Mass	Fields & Interactions

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.

Charge Launcher	Fields & Interactions
Coulomb Force (Static)	Fields & Interactions
Electromagnetic Induction	Fields & Interactions
Magnetic Induction	Fields & Interactions
Magnetism	Fields & Interactions
Pith Ball Lab	Fields & Interactions

MS-PS3: Energy

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.

Air Track	Force & Motion
Energy of a Pendulum	Energy
Inclined Plane - Sliding Objects	Force & Motion
Roller Coaster Physics	Energy
Sled Wars	Fields and Interactions, Force & Motion
Trebuchet	Energy

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.

Energy Conversion in a System	Energy
Energy of a Pendulum	Energy
Inclined Plane - Sliding Objects	Force & Motion
Potential Energy on Shelves	Force & Motion
Roller Coaster Physics	Energy
Trebuchet	

MS-PS3-3: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

Feel the Heat	Energy

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.

Calorimetry Lab	Energy
Energy Conversion in a System	Energy
Heat Transfer by Conduction	Energy
Phase Changes	Chemistry of Materials

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.

Air Track	Force & Motion
Energy Conversion in a System	Energy
Sled Wars	Fields and Interactions, Force & Motion

MS-PS4: Waves and Their Applications in Technologies for Information Transfer

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.

Waves	Waves

MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

Basic Prism	Waves
Color Absorption	Waves
Earthquakes 1 - Recording Station	Geological Processes
Heat Absorption	Weather and Climate
Laser Reflection	Waves
Longitudinal Waves	Waves
Radiation	Waves
Refraction	Waves
Ripple Tank	Waves
Waves	Waves

MS-LS1: 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.

Cell Types	Cells
Embryo Development	Evolution

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.

Cell Energy Cycle	Cells
Cell Structure	Cells
Cell Types	Cells
Osmosis	Cells
RNA and Protein Synthesis	Reproduction

MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Cell Types	Cells
Circulatory System	Body Systems
Digestive System	Body Systems
Senses	Body Systems

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.

Flower Pollination	Reproduction
Honeybee Hive	Reproduction
Seed Germination	Reproduction

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

Fast Plants® 1 - Growth and Genetics	Reproduction
Growing Plants	Reproduction
Inheritance	Reproduction
Measuring Trees	Reproduction
Seed Germination	Reproduction
Temperature and Sex Determination	Reproduction
Temperature and Sex Determination - Metric	Reproduction

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.

Cell Energy Cycle	Cells
Food Chain	Ecology

Photosynthesis Lab	Cells
Plants and Snails	Cells
Pond Ecosystem	Ecology

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.

Cell Energy Cycle	Cells
Dehydration Synthesis	
Digestive System	Body Systems

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.

Reaction Time 1 (Graphs and Statistics)	Body Systems
Senses	Body Systems

MS-LS2: Ecosystems: Interactions, Energy, and Dynamics

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.

Coral Reefs 1 - Abiotic Factors	Ecology
Coral Reefs 2 - Biotic Factors	Ecology
Food Chain	Ecology
Forest Ecosystem	Ecology
Pond Ecosystem	Ecology
Prairie Ecosystem	Ecology
Rabbit Population by Season	Ecology
Rainfall and Bird Beaks	Evolution
Rainfall and Bird Beaks - Metric	Evolution

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Coral Reefs 1 - Abiotic Factors	Ecology
Coral Reefs 2 - Biotic Factors	Ecology
Food Chain	Ecology
Forest Ecosystem	Ecology
Pond Ecosystem	Ecology
Prairie Ecosystem	Ecology

MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Carbon Cycle	Ecology
Coral Reefs 1 - Abiotic Factors	Ecology

Coral Reefs 2 - Biotic Factors	Ecology
Food Chain	Ecology
Forest Ecosystem	Ecology
Pond Ecosystem	Ecology
Prairie Ecosystem	Ecology

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

Coral Reefs 1 - Abiotic Factors	Ecology
Coral Reefs 2 - Biotic Factors	Ecology
Food Chain	Ecology
Forest Ecosystem	Ecology
Pond Ecosystem	Ecology
Prairie Ecosystem	Ecology
Rabbit Population by Season	Ecology
Rainfall and Bird Beaks	Evolution
Rainfall and Bird Beaks - Metric	Evolution

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

Coral Reefs 2 - Biotic Factors	Ecology
GMOs and the Environment	Land, Water and Human Interactions

MS-LS3: Heredity: Inheritance and Variation of Traits

Evolution - STEM Case	Evolution

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.

Evolution: Mutation and Selection	Evolution
Genetic Engineering	Reproduction
Human Karyotyping	Reproduction

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.

Chicken Genetics	Reproduction
Fast Plants® 1 - Growth and Genetics	Reproduction
Fast Plants® 2 - Mystery Parent	Reproduction
Inheritance	Reproduction
Mouse Genetics (One Trait)	Reproduction
Mouse Genetics (Two Traits)	Reproduction

MS-LS4: Biological Evolution: Unity and Diversity

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.

Human Evolution - Skull Analysis	Evolution

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.

Cladograms	Evolution
Embryo Development	Evolution
Human Evolution - Skull Analysis	Evolution

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.

Embryo Development	Evolution

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.

Evolution: Mutation and Selection	Evolution
Evolution: Natural and Artificial Selection	Evolution
Microevolution	Evolution
Natural Selection	Evolution
Rainfall and Bird Beaks - Metric	Evolution

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

Evolution: Natural and Artificial Selection	Evolution
Genetic Engineering	Reproduction

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.

Evolution: Mutation and Selection	Evolution
Evolution: Natural and Artificial Selection	Evolution
Microevolution	Evolution

MS-ESS1: Earth's Place in the Universe

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.

2D Eclipse	Solar System and Beyond
3D Eclipse	Solar System and Beyond
Eclipse	Solar System and Beyond
Moonrise, Moonset, and Phases	Solar System and Beyond
Phases of the Moon	Solar System and Beyond
Seasons Around the World	Solar System and Beyond
Seasons in 3D	Solar System and Beyond
Seasons: Earth, Moon, and Sun	Solar System and Beyond
Seasons: Why do we have them?	Solar System and Beyond
Summer and Winter	Solar System and Beyond

MS-ESS1-2: Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

Gravity Pitch	Solar System and Beyond
Solar System	Solar System and Beyond
Solar System Explorer	Solar System and Beyond

MS-ESS1-3: Analyze and interpret data to determine scale properties of objects in the solar system.

Solar System	Solar System and Beyond
Solar System Explorer	Solar System and Beyond
Weight and Mass	Solar System and Beyond

MS-ESS2: 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.

Carbon Cycle	Geological Processes
Cell Energy Cycle	Cells
Plate Tectonics	Geological Processes
Rock Cycle	Geological Processes
Weathering	Geological Processes

MS-ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

Erosion Rates	Geological Processes
Plate Tectonics	Geological Processes
River Erosion	Land, Water and Human Interactions

Rock Cycle	Geological Processes
Weathering	Geological Processes

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.

Building Pangaea	Geological Processes
Plate Tectonics	Geological Processes

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.

Water Cycle	Land, Water, and Human Interactions

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

Coastal Winds and Clouds	Weather and Climate
Coastal Winds and Clouds - Metric	Weather and Climate
Hurricane Motion	Weather and Climate
Hurricane Motion - Metric	Weather and Climate
Weather Maps	Weather and Climate
Weather Maps - Metric	Weather and Climate

MS-ESS3: Earth and Human Activity

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.

Carbon Cycle	Geological 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.

Hurricane Motion - Metric	Weather and Climate

MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

GMOs and the Environment	Land, Water, and Human Interactions

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.

Carbon Cycle	Geological Processes
Coral Reefs 2 - Biotic Factors	Ecology

MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Carbon Cycle	Geological Processes
Greenhouse Effect	Weather and Climate
Greenhouse Effect - Metric	Weather and Climate

MS-ETS1: Engineering Design

MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Feel the Heat	Chemical Reactions
GMOs and the Environment	Land, Water, and Human Interactions
Genetic Engineering	Biomedical Engineering
Pendulum Clock	
Trebuchet	

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

Digestive System	Body Systems
Feel the Heat	Chemical Reactions
GMOs and the Environment	Land, Water, and Human Interactions
Genetic Engineering	Biomedical Engineering
Pendulum Clock	
Trebuchet	

MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Digestive System	Body Systems
GMOs and the Environment	Land, Water, and Human Interactions
Genetic Engineering	Biomedical Engineering

MS-ETS1-4: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Feel the Heat	Chemical Reactions
Pendulum Clock	
Trebuchet	