Middle School Science Framework

Concepts/Phenomena of:	Performance Expectations	Key Topics	Standards	Activities/Projects	Materials
Physical Science	developing and using models, planning and conducting investigations, analyzing and interpreting data, using mathematical and computational thinking, constructing explanations	Structure and Properties of Matter	MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.	Gumdrop Atoms/ Marshmallow	
			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.	STEM Particle Dance States of Matter	
		Chemical Reactions	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.	Exploding Baggie Experiment Sourdough Starters Obs. Log	
		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; i.e. the impact of collisions between two cars.	Paper Plate Marble Maze K-2	
			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.	Marble Run	
				Paper Rollercoaster	
			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; i.e. balanced vs. unbalanced forces.	Sinking Ships	
		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.	Create Homemade Thermometer	
			MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.*		
			MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	Solar Oven to bake cookies	
		Waves and Electromagnetic Radiation	MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	Exploring Light stations	
			MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	Voice Recording Activity	
				Info Dump	
				Video	
Biological/Life Science		Structure, Function, and Information Processing	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.	Wet Mount Onion Slide	
			MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function.	Video	
			MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells	Brain Communication Webquest	
			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.	Nervous System & Information Processing	
		Matter and Energy in Organisms and Ecosystems	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.	Experiements and Models	
			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.	Ecosystem Museum	
				Preserving Biodiversity | Technology for Biology | SAP Insights	
				biodiversity audit	
			MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	Activity 8: Saving the World–One Ecosystem at a Time	
		Growth, Development, and Reproduction of Organisms	MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Growth Factor	growth.pdf
			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.	Cereal Reproduction	
			MS-LS4-5. Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.	Genetically Modified Foods	MS-LS1-5: Environmental and Genetic Growth Factors
			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.	Fossil interactive notebook	
		Natural Selection and Adaptations	MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.		
			MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	Battle of the Beaks	
Earth & Space		Space Systems	MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	Hands-on Sun Directness, Human Sun Dial Great Gravity Escape w/ Water Ballons	Sun, Earth, Moon
			MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.	Scale Model Solar Sys	Solar System
		History of Earth	MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Ever-Changing Earth's surface (formation of the Rockies)	
			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	Pangaea Project	
			MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history	Paleo-Slueths	
		Earth's Systems	MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.	I Can't Take the Pressure!	
			MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	Climate Change	
				Climate Change and Sea Creatures (Asexual Repro)	
		Weather and Climate	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.	Types of Natural Disasters Technology	
		Human Impacts	MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).	Building Earthquake Proof Structure	
				Enviroment Degredation and Solutions	
				Soil Erosion	